

Handbook of Blissymbolics

H.Silverman / S.McNaughton / B.Kates





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Handbook of Blissymbolics

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A product of the project entitled
The Formative Evaluation of the
Ontario Crippled Children's Centre
Symbol Communication Program.
This research project was funded
under contract by the
Ministry of Education, Ontario.



This *Handbook* was compiled to serve as a general reference and as a component of B.C.I. elementary workshop training.

It is *not* intended as an independent, comprehensive instructional program in Blissymbolics. Workshop training is strongly recommended for instructors wishing to teach Blissymbols.

For further information see insert, last page of *Handbook*, or write:

Blissymbolics Communication Institute
350 Rumsey Road
Toronto, Canada M4G 1R8



Blissymbol



Help



Knowledge

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HANDBOOK OF BLISSYMBOLICS

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I INTRODUCTION

A. Purpose of the Handbook

The purpose of this Handbook is to provide instructors, Blissymbol users, parents and administrators with a reference guide, as they consider and use Blissymbolics as an augmentative communication system. Before 1975, communication with Blissymbols was occurring in settings scattered throughout North America, with little formal documentation as to its effectiveness. Innovative and enthusiastic instructors had pioneered Blissymbol programs, following the example of the first application of Blissymbolics in October 1971 at the Ontario Crippled Children's Centre (Kates, and McNaughton, 1975), but attention had been focused upon program implementation. Published information about the effectiveness of Blissymbolics was limited to two O.C.C.C. Year End Reports (1972-73, 1974) and a study by Harris and Vanderheiden (1975).

A Formative Evaluation Study was initiated in 1974 to collect information from instructors in a range of settings regarding the effectiveness of the symbol system, based on their records of symbol performance and their experience in providing instruction. The formal results of this study, along with the collective experience of the research team, provided the information presented in this Handbook. It is hoped that the inclusion of both the study findings and the suggestions of experienced instructors will provide useful reference material for the instructor, Blissymbol user, parent and administrator.

The content and format of this Handbook have been influenced by several underlying assumptions:

1. That communication is considered to be the right of every human being. Given the uniqueness of every individual, this right should encompass the freedom to choose the mode of communication most acceptable to the user when he is sufficiently mature to accept responsibility for the decision.

2. That a person's communication system must be suited to his learning capacity and his individual needs at all stages of his development. Before the non-speaking person acquires the maturity to decide independently his preferred means of communication, it is the responsibility of the parent and instructor to provide a communication mode compatible with and transferable to the traditional communication system. The right of the individual ultimately to accept or reject either or both systems should be recognized.
3. That the system's long-term communication capability, comprehensiveness and compatibility with traditional orthography must be given strong consideration, along with speed and ease of learning and personal value to the user.
4. That a visual communication system composed of graphic symbols offers at present the most viable medium for expressive communication by physically handicapped persons who are unable to speak. It is viewed as an augmentative to communication abilities that are already being used, never as a substitute for previously acquired communication skills.
5. That not all graphic symbol systems are equal with regard to the internal structure of the symbol, or in the manner in which meaning is conveyed through presentation of more than one symbol. Different systems require different cognitive skills on the part of the learner due to their unique organizations. As no two individuals are ever alike, it is necessary for the instructor to have knowledge of the learning capabilities of the potential student, as well as an understanding of the characteristics, strengths and weaknesses of the system, in order to match the student with the system properly.
6. That the instructor's objective should be to provide a communication medium that utilizes the student's strengths. Acquisition of the system is always seen as facilitating communication, not as an end in itself. It should require minimum effort on the learner's part, so that attention can be directed primarily to the message of communication.

Although much development and research is still required in the general area of non-speech communication and in the specific application of Blissymbols, there is a pressing need now for augmentative communication

media. In response to this need, the Handbook has been written, but with the perspective that there is still much to be learned. It is important to share the information currently available so that instructors, parents, administrators and non-speaking persons can make responsible decisions. It is imperative, however, to remember that much of the content of the Handbook is offered in the form of suggestions and alternative choices and not as outlines to be rigidly followed. Due to the very formative state of the art, it still remains with each instructor to draw on clinical experience, knowledge of instructional principles and intuitive awareness of the symbol user's needs in order to apply Blissymbolics successfully in individual situations.

Strict adherence to the Handbook outline is requested in one area only: instructions for symbol construction and drawing are provided in order to maintain standard system forms; all instructors and users are asked to follow the format presented.

It is hoped that the Handbook will provide a resource from which the instructor, Blissymbol user, parent and administrator can select the information relevant to a particular situation. It will not provide specific program content nor will it offer detailed strategies regarding teaching students to communicate or mastering the Blissymbols. Rather, it will provide: (1) information to assist in assessment, matching the non-speaking person with the appropriate system and level, programming, providing support for the program, and evaluating progress of the symbol user; (2) introductory information about the system of Blissymbolics; (3) many practical ideas relating to teaching aids, symbol displays and technical aids.

It is hoped that through KNOWING the non-speaking person, the system, the environment in which the person functions, and the persons with whom the potential Blissymbol

user will relate, the instructor can apply her knowledge of teaching to develop an effective communication program.

The Handbook offers the collective experience of instructors from over 20 settings. Through their faithful record-keeping and innovative programming, the effectiveness of Blissymbolics as a communication medium has been amply demonstrated.

B. Acknowledgements

We are deeply appreciative of the exceptional support given to the project by the research instructors and their administrators, especially to the O.C.C.C. supervisors, Ruth Gannon, Jane Staub and Maurice Izzard, for their understanding of the extensive time involvement in research by team members. Participating in the study were:

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Willowdale, Ontario

Central Wisconsin Colony and Training School
Madison, Wisconsin

Centre for Exceptional Children
Peterborough, Ontario

Ecole Victor Doré
Montreal, Quebec

Erie County Health Care Centre for Children
Buffalo, New York

Georgia Retardation Centre
Atlanta, Georgia

Hamilton District Society for Crippled Children
Hamilton, Ontario

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Warren, Michigan

Kitchener-Waterloo Rotary Centre
Kitchener, Ontario

Landsdowne Children's Centre
Brantford, Ontario

MacKay Centre
Montreal, Quebec

Mary Free Bed Hospital and Rehabilitation Centre
Grand Rapids, Michigan

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Kingston, Ontario

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Smith Falls, Ontario

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C. Notes on Format

1. Throughout this publication, instructors will be referred to by the feminine pronouns, and symbol users will be referenced using the male pronouns. This procedure has been adopted to avoid the cumbersome "his/her" and "he/she".
2. For purposes of discussion, retarded and non-retarded groupings have been defined on the basis of *Observed I.Q.* rating, as less than 80 and greater than 80 respectively.
(See Appendix 2, Evaluation Study, p.113).

3. Symbols have been drawn as accurately as possible using a template designed by Charles K. Bliss. They are not, however, to be considered as models for construction.
4. The Introductory pages to the Handbook of Blissymbolics for Instructors, Users, Parents and Administrators, the Handbook Appendices, the Formative Evaluation Study, and the Evaluation Study Appendices have been separately colour-coded to assist the reader.

Because of the extensive cross-fertilization of ideas among research team members, authors are not indicated for individual chapters; however, the responsibility for the writing of specific subject areas was divided as follows:

Barbara Kates:	Assessment Social Psychological Implications A Study of the Population with Reference to the Relationship between SYMSKILL and Assessment-Related Variables Factors Affecting Limited Achievement
Shirley McNaughton:	Syntax Program Reading and Reading Activities
Dale Sutherland:	Vocabularies Speech and Language Development
Jinny Storr:	The Blissymbol System Drawing Blissymbols with a Template
Paula Ashmead:	How to Draw Blissymbols Research Goals Population Methodology Returns The Family
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Harry Silverman:	General consultation and Supervisor

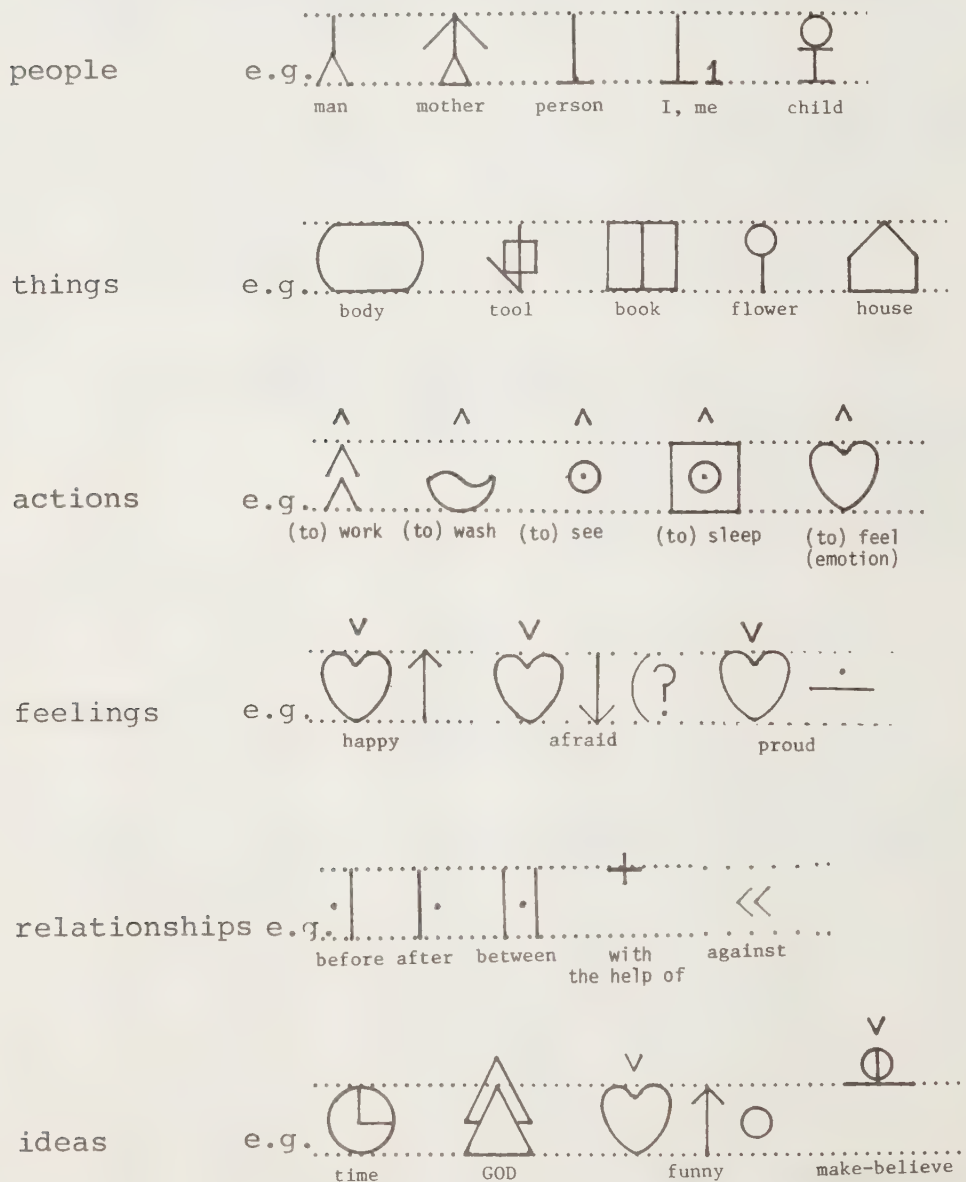
II THE BLISSYMBOL SYSTEM

A. Description

1. INTRODUCTION

Blissymbolics is a visual-graphic symbol system capable of providing total, comprehensive communication. It is the creation of Charles K. Bliss of Sydney, Australia. For a full exposition of the system the reader is referred to Semantography (Bliss, 1965) and The Book to the Film 'Mr. Symbol Man' (Bliss, 1975).

Blissymbols represent:



(See How to Draw Blissymbols section, p. 51)

BLISSYMBOLS ARE CONSTRUCTED FROM A SMALL NUMBER OF BASIC GEOMETRIC SHAPES.**

Many shapes require a full space, vertical and horizontal:



Some shapes occupy only a half space, vertical or horizontal:



Some shapes fill only a quarter space:



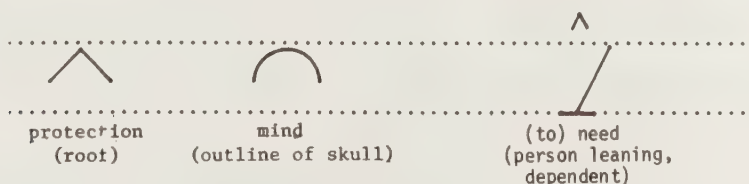
SYMBOLS REPRESENT MEANINGS IN THE FOLLOWING WAYS:

Many symbols are pictographic, making them easy to learn and to remember, because they resemble the objects or concepts for which they stand:



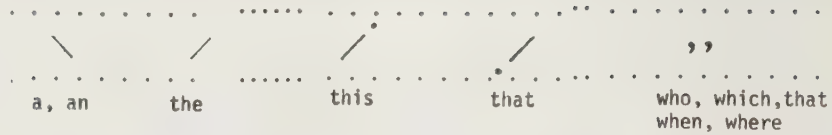
Others are abstract.

(a) Some abstract symbols are ideographic:

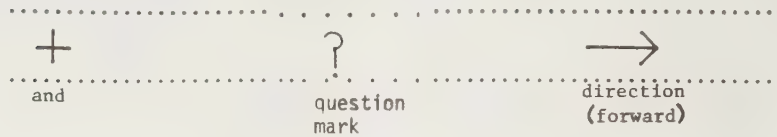


**This section is based on The Book to the Film 'Mr. Symbol Man', p. 31.

b. Some are arbitrary:

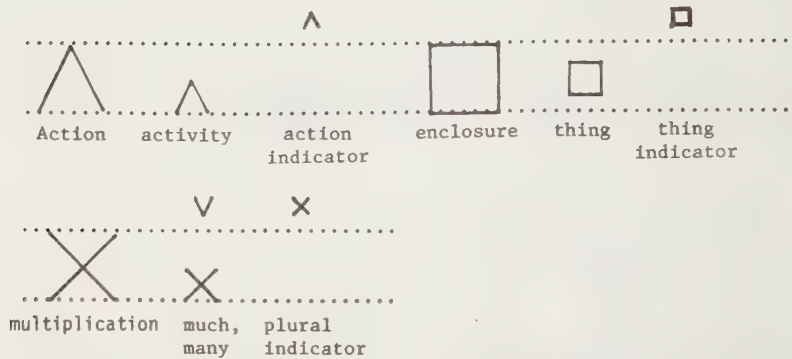


c. Others are international symbols, recognized and used throughout the world:

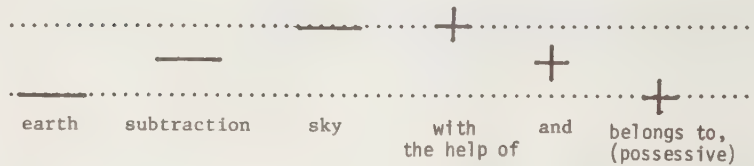


2. FACTORS THAT DETERMINE SYMBOL MEANINGS

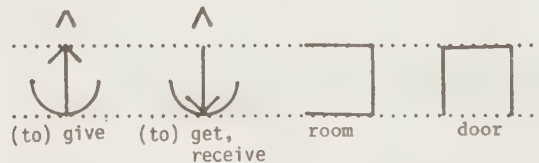
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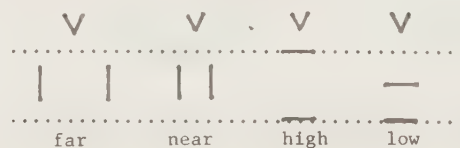
POSITION:



DIRECTION/ORIENTATION:

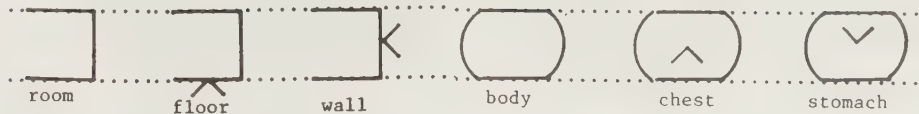


SPACING OF SYMBOL ELEMENTS:

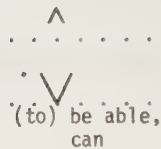
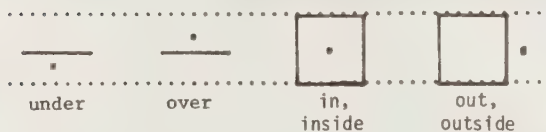
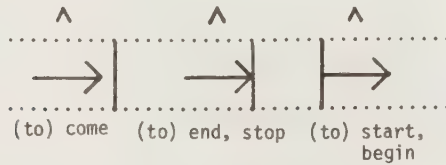


POINTERS

The position of the pointer determines the meaning of the symbol.

POSITIONAL REFERENTS:

The position of the referent determines the meaning of the symbol.



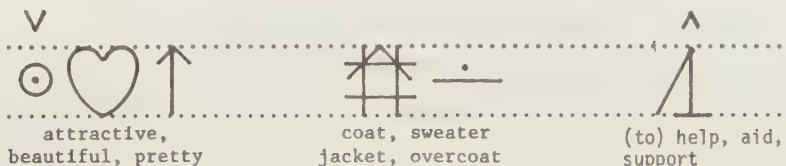
The position of the dot with reference to the *evaluation symbol* indicates, "an Evaluation BEFORE an Action. We may say, 'We can do it. We can jump that fence...'. But we may NOT be able to do it. It may be an idle boast." The Book to the Film 'Mr. Symbol Man', p. 108.

3. DEVICES FOR EXPANDING THE SYMBOL VOCABULARY

The various devices for enlarging vocabulary have particular value for the physically handicapped symbol user whose minimal range of motion or deficient motor control put a special limitation on the number of symbols to which he may have access.

ONE SYMBOL, MANY MEANINGS

A symbol may represent a number of synonyms or related words. The particular meaning to be applied is determined by the context.



Because of limited space on current symbol displays, only one word appears under each symbol, although the symbol may represent several meanings. In communication with a symbol user the 'listener' is encouraged to make use of synonyms wherever appropriate instead of confining meaning only to the word on the display.

Note: In future BCF stamps and displays the word accompanying a symbol will appear above the symbol.

INDICATORS

Indicators placed above a symbol identify symbol meaning categories which may be thought of as roughly equivalent to parts of speech in written language.

Indicators are located one-quarter space above the skyline of the matrix.



 plural
 indicator

Derived from , the universal symbol for multiplication. Place the *plural indicator* above a symbol to create a plural meaning.


 boy becomes boys



 thing
 indicator

A miniature version of the symbol  (representing the crystal cube, the basis of all matter).

Placed above a symbol the *thing indicator* designates a thing/noun.

Mr. Bliss uses the *thing indicator* only for those things which are concrete, which can be felt, handled, seen.

In BCF usage, "noun" symbols are generally unmarked. In cases where one symbol may have both an abstract and a concrete meaning, the *thing indicator* is used with the concrete meaning.



Derived from Mr. Bliss chose this symbol as representative of the unstable character of human evaluation, with its tendency to waiver back and forth on a scale moving between positive and negative:

e.g.



Placed above a symbol the *description* (evaluation) *indicator* makes the symbol into an adjective or an adverb. However, Mr. Bliss emphasizes that descriptive terms always involve a value judgment. The user weighs these words according to his own scale of values. What is beautiful in the eyes of one person may be ugly in the eyes of another.

ACTION/VERB INDICATORS** :

^
.....
.....
action
indicator

Derived from the large cone



symbolizing the first action on earth, a volcano erupting. Placed above a symbol the *action indicator* designates an action or verb.



Note: The *action indicator* designates both 1) the infinitive form of the verb and 2) action taking place in the present. For tense indicators see next page.

(**See Appendix 2(a) Grammar Block for tense indicators.)

)
.....

.....
past action
indicator

Derived from the large symbol.....),
representing a parabolic mirror reflecting
what lies behind it. (Left-right sequenc-
ing is implied.)

Placed above a symbol, the *past*
action indicator signifies that the
action symbol is in the past tense.

)
.....
Λ 3 O
he ate
was eating
has eaten

Λ
.....

.....
action indicator

See page 16 for explanation of the
symbol.

Placed above a symbol, the *action*
indicator may signify that action is
taking place in the present. In this
case, the verb is unmarked for tense.

Λ
.....
Λ 3 O
he eats
is eating

(
.....

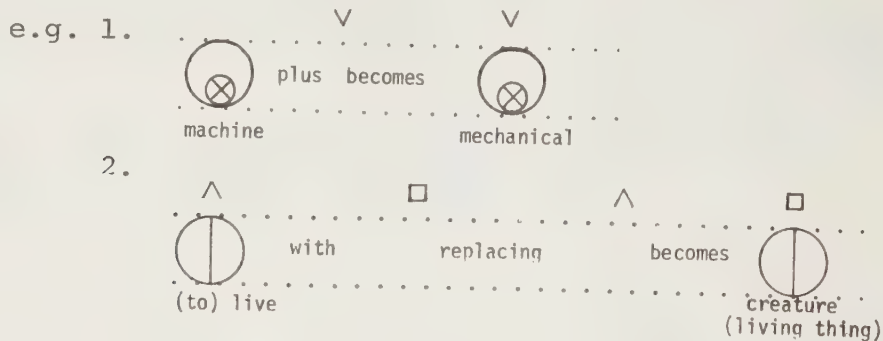
.....
future action
indicator

Derived from the large symbol.....(,
representing a parabolic mirror focused
on what lies in front of it. (Left-right
sequencing is inferred.)

Placed above a symbol, the *future*
action indicator signifies that
the action symbol is in the future tense.

(
.....
Λ 3 O
he will eat
will be eating.

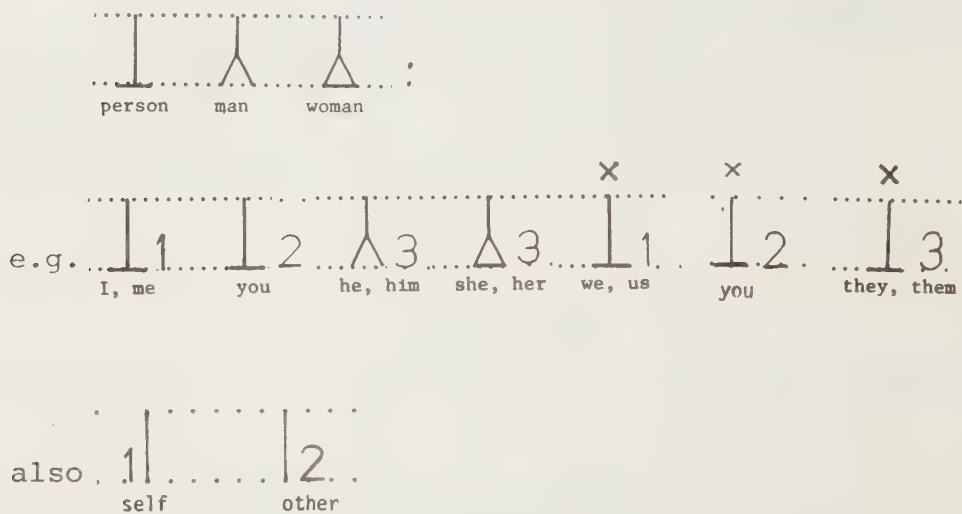
Note: Indicators may be used to create new meanings by adding the desired indicator to an unmarked symbol or by substituting a different indicator for the one which appears with the symbol on the display. In recording a message the new indicator would be used.



NUMBERS:

Numbers are used with symbols to create new meanings.

Personal pronouns are produced by adding numbers to the three basic person symbols:



Days of the week are identified through the use of numbers:

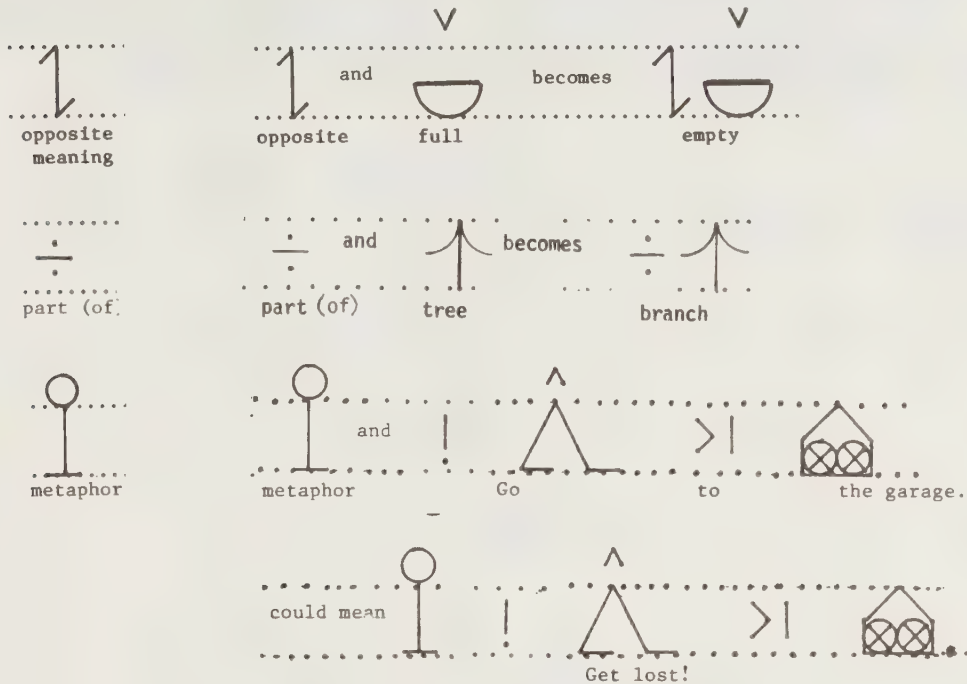


STRATEGIES :

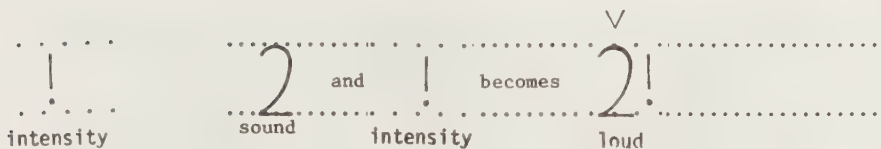
The concept of strategy usage has been identified in order to enlarge the necessarily limited vocabulary available on symbol displays.

A strategy can be used with an existing symbol to create a new meaning.

The strategy symbol is ordinarily placed one quarter space before the symbol with which it is to be used.



Note: If the strategy symbol relates to the whole phrase, as in the example above, the symbol is used as an independent symbol and is placed a full space before the phrase.



EXCEPTION to the rule governing placement of a strategy symbol:

Used as a strategy, the *intensity symbol* is placed one quarter space after the symbol it modifies. See page 24 for use of the *intensity symbol* in imperative form.

Ⓢ

See page 22 for use with combined symbols.

combine
indicator

Strategies listed below are not part of Mr. Bliss' original system. They have been devised by symbol instructors and symbol users as communication aids. They are included here as possible supplementary ways of enlarging vocabulary for every day communication.

Blissymbol part Ⓢ ** Blissymbol part

of egg (seed of life) could be life

similar similar to man and machine

could be robot

similar sound Ⓢ similar sound Ⓢ flower could be flour Ⓢ

Note: This strategy would not be useful in international communication. While it works in this case for English, a French-speaking person could not arrive at the same symbol for flour using this strategy.

belongs to, belongs with

belongs with needle could be thread

** Ⓢ accompanying a symbol indicates that this is a Blissymbolics Communication Foundation version of the symbol or explanation and is not in accordance with the C.K. Bliss version.

A combined symbol is a grouping of symbols created by a symbol-user or instructor to arrive at a new symbol meaning. It is for personal use only. The parts of a combined symbol are always sequenced; superimposed symbols or pictographs are not acceptable.

The composition of a combined symbol can vary with the developmental and cognitive level of the creator.

Guidelines for Creating Combined Symbols:

1. Aim for conciseness, transmitting only the essential meaning elements.
2. The classifier (the main element in the total meaning) is usually placed first in the sequence.
3. Modifying symbols usually follow the classifier sequentially.

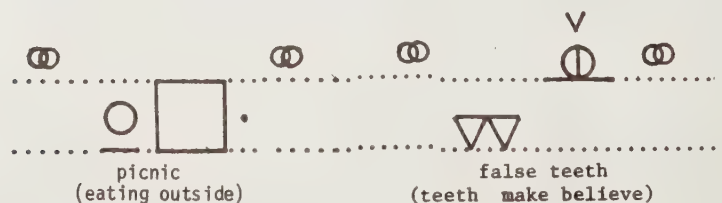
EXCEPTIONS: the following modifiers precede the classifier -

<i>much/many</i>	<i>before</i>
<i>opposite meaning</i>	<i>after</i>
<i>part (of)</i>	<i>over</i>
<i>similar</i>	<i>under</i>
<i>in</i>	<i>out</i>

Guidelines for Recording**a Combined Symbol:

1. When a user creates a combined symbol, the individual symbols he uses from his display may each have its own indicator. In recording the new symbol expression we recommend using only one indicator, usually over the first Symbol in the combination. Select the indicator appropriate to the total meaning of the new symbol expression.
2. Place the *combine indicator* before AND after the symbol grouping to indicate that the new combination is not an approved symbol but rather the unique invention of an individual symbol user.

The *combine indicators* should be located one quarter space above the top line of the matrix.

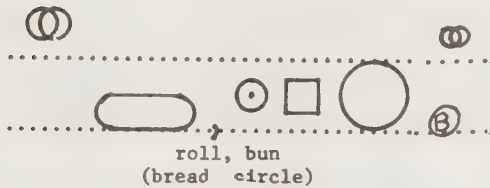


(** See How to Draw Blissymbols section p.51.)

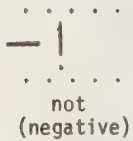
3. In drawing a combined symbol leave a quarter space between each of the component symbols.

EXCEPTION: In a combined symbol one or more units of which is a compound symbol, the meaning units may be set off from each other by a comma. Use of the comma will result in a half space (rather than the usual quarter space) between symbol units. The wider spacing will help to reduce visual difficulty in distinguishing between components of the new symbol expression.

Use of the comma in this instance is at the discretion of the instructor or symbol user.



THE NEGATIVE:

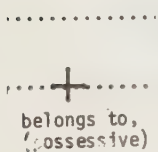


To express a negative meaning, the *negative symbol* is placed a full square before the symbol the meaning of which it alters.

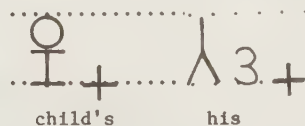


For use of the negative with an action symbol see page 38.

THE POSSESSIVE:



To form a possessive, place the *possessive symbol* one quarter space after the affected noun or pronoun:



Make certain the horizontal of the *possessive symbol* lies on the ground line of the matrix.

Note: On the 100 symbol and 200 symbol displays (December 1975) the possessive form of the word appears under the pronouns. This is done for the benefit of the young child who is not yet ready for full use of the possessive form.

THE IMPERATIVE:



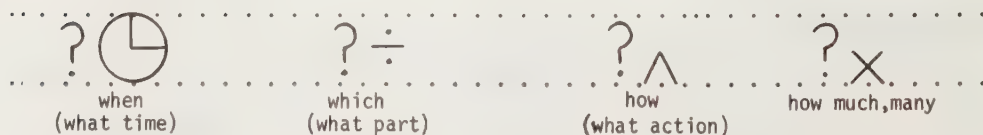
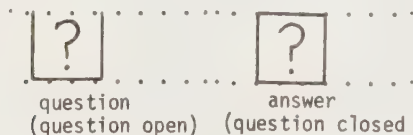
To form the imperative, use the *command symbol* as an independent symbol, placing it one full space before the verb.



(See Syntax section p.32 for details.)

QUESTION SYMBOLS:

All symbols for question words incorporate the universally recognized question mark.



(See section on Syntax p.32 for word order posing questions.)

THE RELATIVIZER:

.....

”

.....
 who, which, that
 when, where

The *relativizer* is used to introduce a relative clause. The word equivalent of the symbol is determined by the context.

The *relativizer* is not interchangeable with question symbols, which in English 'translate' into the same words.

Here is a symbol sentence using the *relativizer*:

.....
 ..< ⊕ /  ” ⊥ 
 There is the building where I work.

The following sentence emphasizes the distinction between the question symbols and the *relativizer*:

.....
 ? ⊥ ⊕ /  ”   / 
 Who sees the man who is sitting on the chair?

MEANING - BIG MEANING, LITTLE MEANING:

The same symbol may have a big meaning and a little meaning.

These concepts refer to symbols such as

.....
 (big meaning) and  (little meaning)
 (to) own, (to) have
 possess

and

.....
 (big meaning) and  (little meaning)
 (to) live (to) be

The generic meaning of the word is the same but the size difference either expands or reduces the meaning of the

symbol. For example, "to have....does not indicate ownership outright, but it stands between this and temporary ownership. It has a 'smaller' meaning than *possession* and this is indicated by minimizing the symbol for *ownership*." (Bliss, 1965, p. 367)

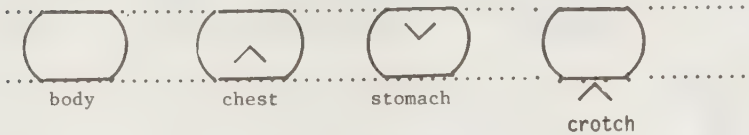
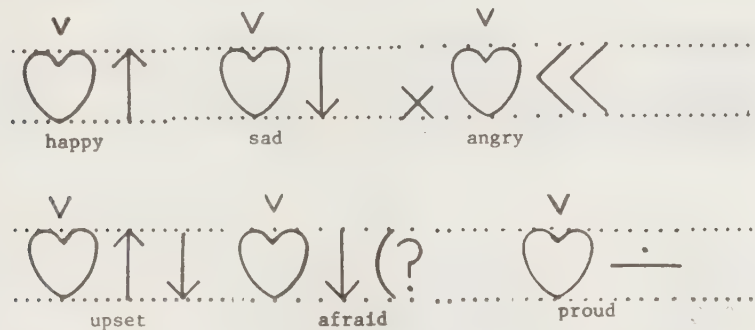
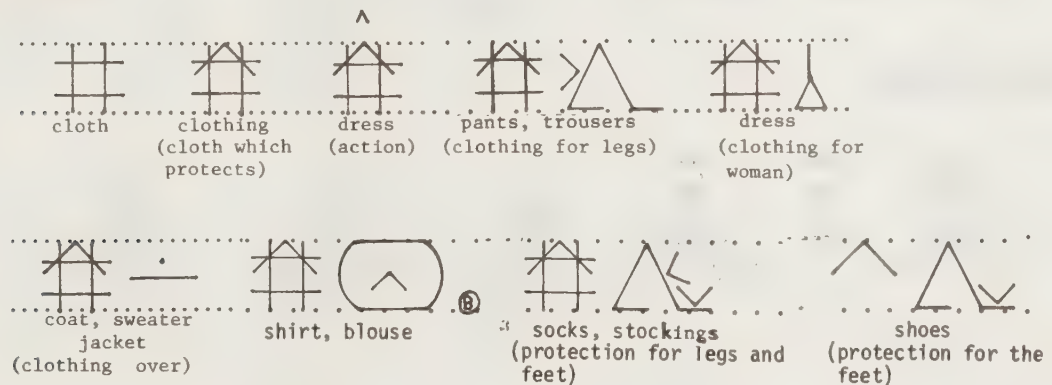
PUNCTUATION:

Blissymbolics uses the following standard punctuation marks:

.....

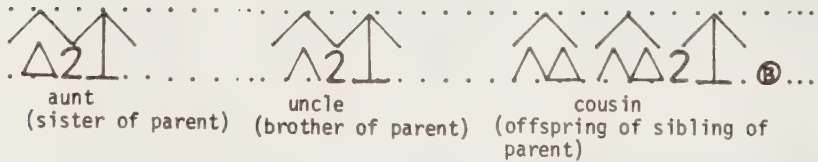
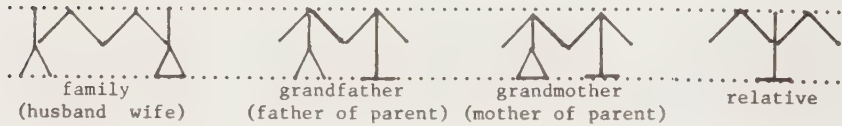
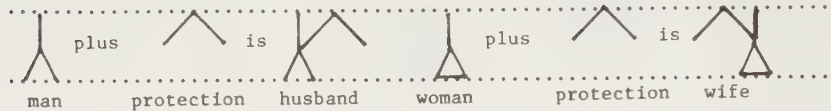
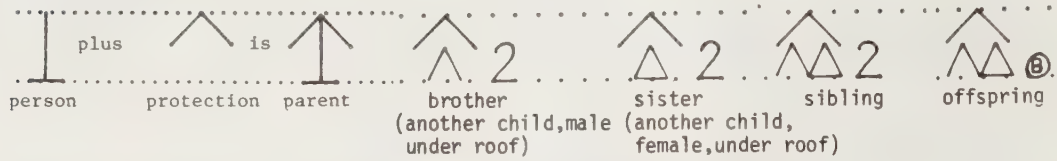
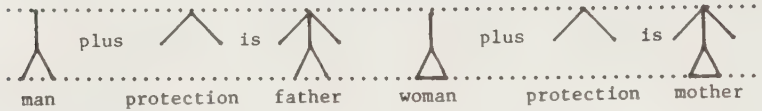
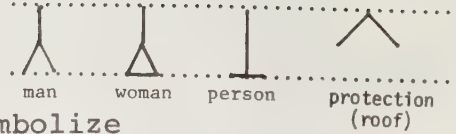
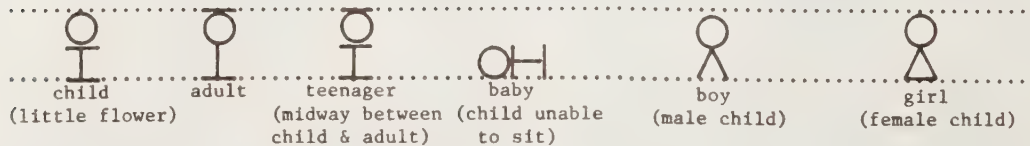
e.g. • • • • • comma • • • • • period, dot •

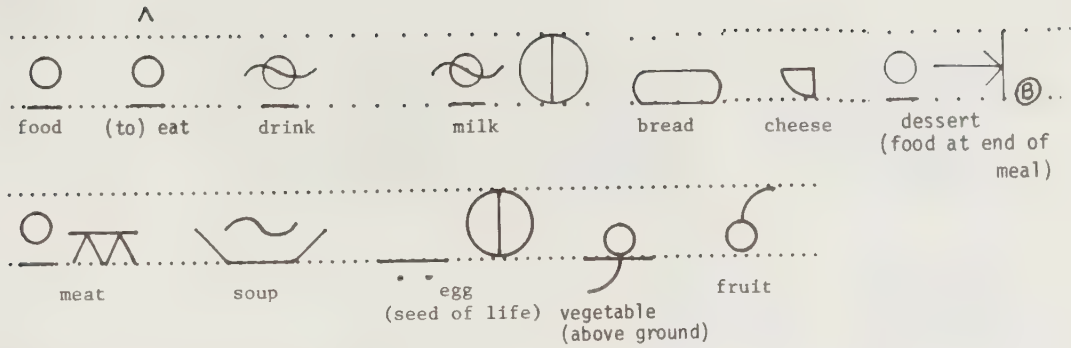
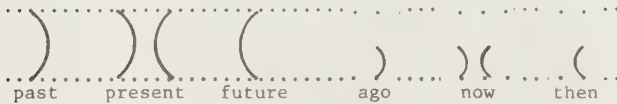
4. SOME FAMILIES OF SYMBOLS FREQUENTLY USED

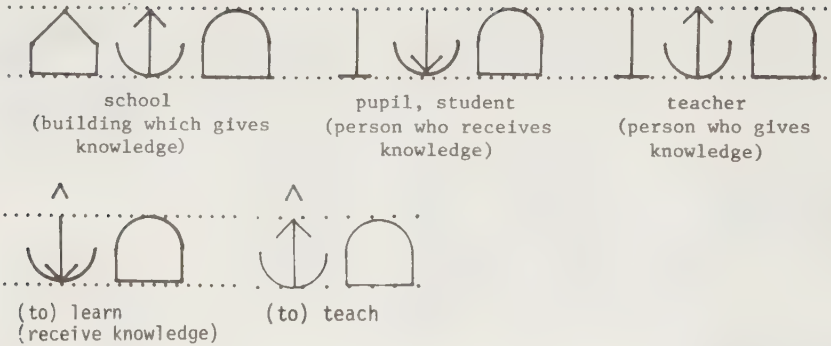
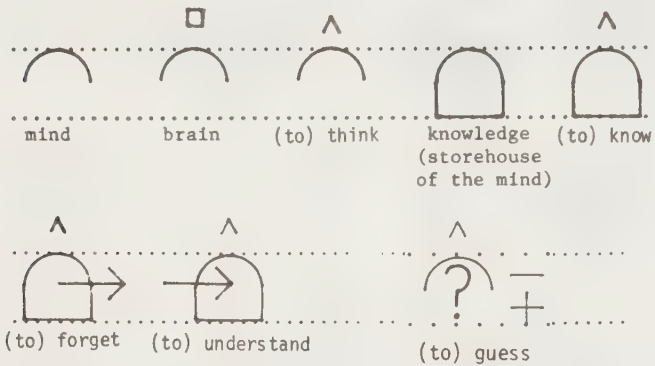
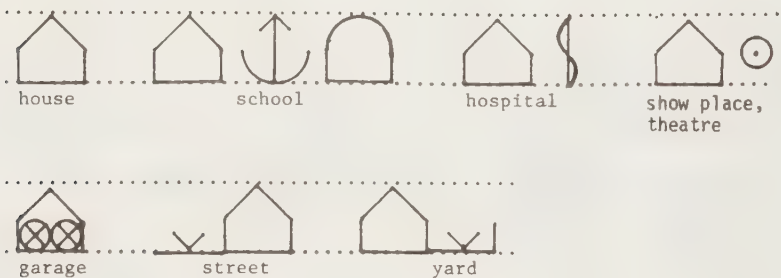
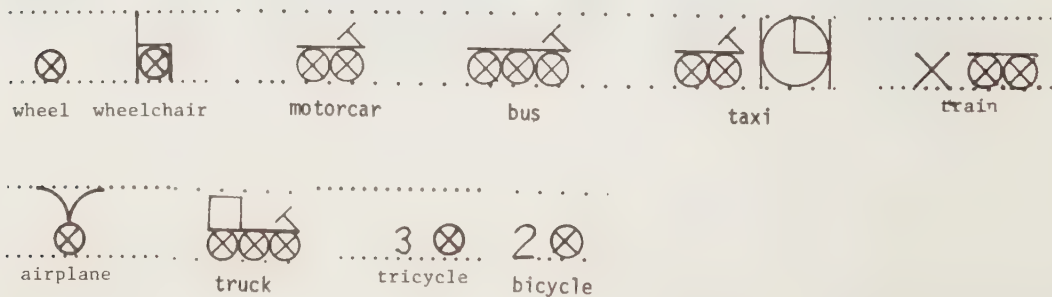
BODY PARTS:EMOTIONS:CLOTHING:

THE FAMILY:

By combining the four basic symbols in various ways it is possible to symbolize the family and its members.

MORE PEOPLE:

FOOD:TIME AND THE CALENDAR:

SCHOOL:'MIND' SYMBOLS:BUILDINGS, ETC.:VEHICLES:

Miscellaneous

	
yes	no

		
much, many	more	most

B. Syntax

1. INTRODUCTION

The beginning symbol student in some ways resembles the child during the early stages of first-language development. Like the young speaking child, the symbol user expects to be understood if he uses any appropriate symbols at all, and he will usually be correct in this expectation as long as he is communicating with a sensitive instructor and with persons who are aware of most of his experiences. In terms used by Roger Brown (1973) with regard to early speech, the beginning student's symbol utterances could be described as "well-adapted but narrowly adapted" (p. 242). If the symbol user is to communicate with a wide range of people (some with no knowledge of his experiential background or of what he might want to talk about), as the speaking child does, he must learn to say more. He must express everything that might be required for comprehension by persons with varying degrees of knowledge, yet he must not utilize an excessive number of symbols given the time requirements of symbol communication and the time restraints of interpersonal situations. The symbol user must become "widely and flexibly adapted" in producing efficient symbol sentences capable of conveying the desired meaning in each situation. Syntax, (that is the way in which Blissymbols are arranged to produce grammatical wholes), warrants the specific attention of the instructor.

Unlike the young child learning to speak, the symbol user cannot look to all persons in his environment to present him with a large number of examples of experienced symbol expression. Nor can he expect all listeners to provide him with reliable feed-back through which he can test the adequacy of his symbol utterances. The persons with whom he communicates will vary widely in both their expressive and receptive capabilities with regard to Blissymbolics. The symbol user must learn to assess his "listener's" receptiveness to Blissymbolics in order to utilize his listener's responses in evaluating the effectiveness of a symbol statement. Arranging for as many experiences as possible in which the user has the opportunity for both receptive and expressive symbol communication becomes an important responsibility of the symbol instructor.

The variable *ability to deal with listener's misunderstanding* * is shown throughout the Evaluation Study to be an indicator of symbol skill (SYMSKILL). This is not surprising, for the symbol user who can adapt his symbol utterances to meet the varying needs of his "listeners" is demonstrating a high degree of competence with the system. In order to attend to the particular communication problems of specific persons in specific situations, and in so doing to respond appropriately within a particular situation, the symbol user must be able to automatically express meanings at different levels. Brown (1973) suggests that with the automatization of a large segment of language, the human being's limited central channel capacity is free to cope with the exigencies of particular communication problems. This capability is particularly relevant for the symbol user, relating as he must to the widely varied symbol competencies of many different listeners. When a symbol user demonstrates this skill, he is indicating that he has reached a high level of symbol competency. (See Appendix 9 for examples of techniques to expand symbol communication experiences.)

Blissymbolics as a medium of communication has not been widely enough utilized or researched to allow for the empirical identification of widely used types of symbol sentence structures or the formulation of rules for effective symbol use. In many instances the symbol student and symbol instructor are at the same level of proficiency with regard to the system, with the symbol user having much more expressive experience. Little attention has yet been directed to the unique constructions possible within this purely visual communication system; there is however a growing awareness that the syntax which pertains to the written forms of spoken languages cannot be directly applied to Blissymbolics. It must be viewed as an independent visual communication system.

In the development of Blissymbolics as an international communication system, C.K. Bliss (1965, 1975) devised rules for

*All variables appear in italics and are referenced in Appendix 1 of the Evaluation Study.

the formulation of symbol sentences. These rules will be followed in all Blissymbolics Communication Foundation publications. They are demonstrated in the examples which follow and are offered as a preliminary guide to the instructor. The rules provide a syntax framework for the symbol instructor and user during these early years of Blissymbol communication and should be of value primarily to the symbol user who is able to point. If the rules are followed by all those sharing responsibility for the student's instruction, consistent models can be presented. As the student becomes competent in symbol communication he should be able to evaluate the effectiveness of the rules and create new forms of Blissymbol sentence structure.

The formulation of a comprehensive Blissymbolics grammar can only be undertaken following widespread use by an experienced, adult, symbol-using population. It should also be kept in mind that two modes of symbol communication will need to be considered: direct communication (face-to-face), in which the non-symbol strategies of gestures, eye pointing, facial expressions and vocalizations can contribute to successful communication; indirect communication (written) in which immediate feedback is not possible and in which only easily interpreted symbol strategies, initial consonants, spelling and the spacing and arranging of the symbols can contribute to the relaying of meaning. Within the two modes of symbol communication, various output styles (the manner in which symbol sentences are structured) will need to be developed.

An immediate need is apparent for a special style of communication for the severely disabled. Relying, as they do, on electronic equipment, eye coding, eye pointing or directed listener scanning, the severely disabled require development and refinement of further Blissymbolic sentence forms which can provide effective communication with a minimum number of symbols. The development of specialized expressive styles within particular areas of symbol usage and for individual symbol users should make symbol communication even more interesting in the future. It is quite probable that different syntax models will develop for the pre-school child, the severely handicapped primary child who will always require the assistance of technology for communication, the person using Blissymbols to augment partially-functional speech, etc.

2. ORDERING OF SYMBOLS TO PRODUCE SENTENCES

STATEMENT FORMS¹

1. rule: ^

 thing act (on/with) thing

example: ^

 (The) animal needs water.

2. rule: ^

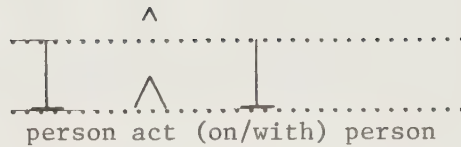
 thing act (on/with) person

example: ^

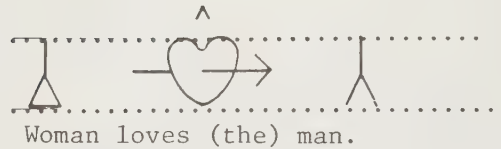
 (The) typewriter helps him.

¹Semantography, 1965, p. 316; Syntax Supplement, 1975, p. 14.

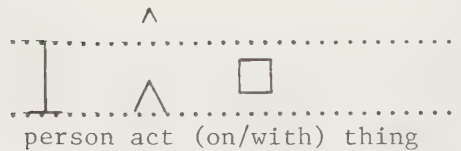
3. rule:



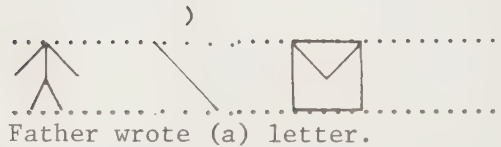
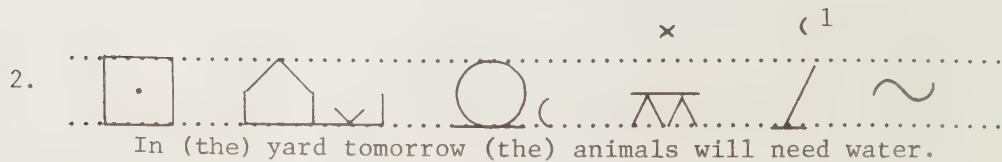
example:



4. rule:



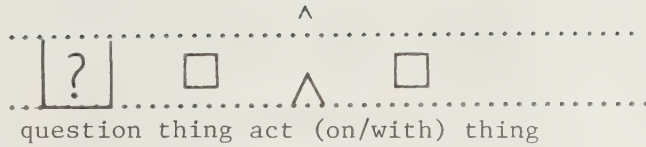
example:

ENLARGED SENTENCE

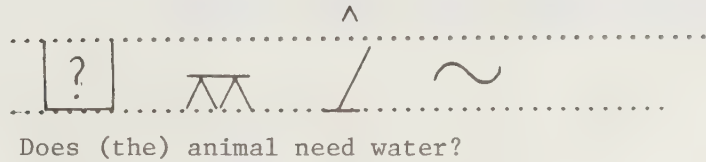
¹Tense indicator is optional, as time has been mentioned earlier in sentence.

QUESTION FORM

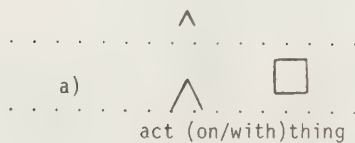
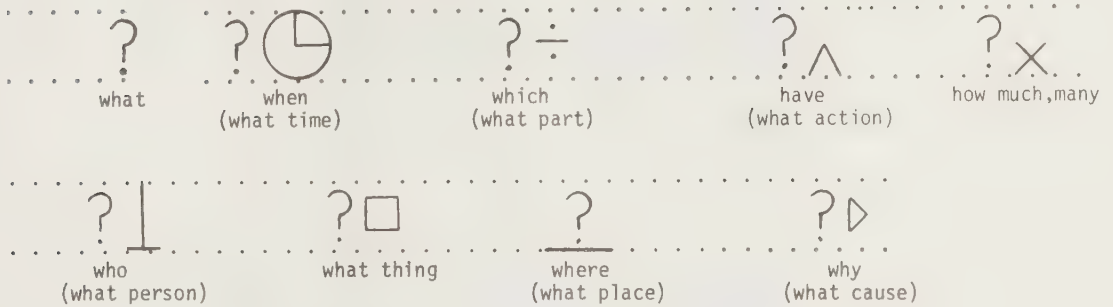
1. rule:



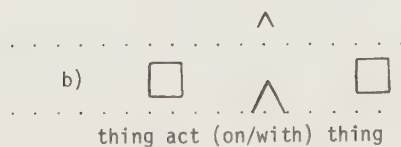
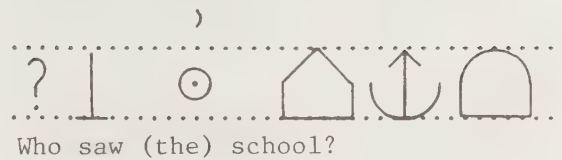
example:



2. Question Symbols

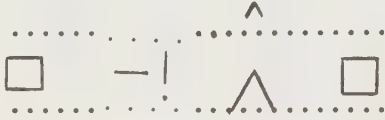


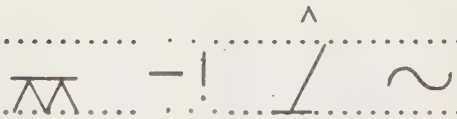
example:



example: 
 Why (does) (the) animal need water?

NEGATIVE STATEMENTS AND QUESTIONS

1. rule 
 thing not act (on/with) thing

example: 
 (The) animal doesn't need water.

2. rule: 
 question person not act (on/with) thing

example: 
 Won't father be writing (a) letter?
 (write)

COMMAND FORM

1. rule:

..... ^
 ! ^

 command action

..... ^
 ! ^

 Sit!

2. rule:

..... ^
 ! ^ □

 command action (on/with) thing

example:

..... ^
 ! → ^

 Stop (the) work.

POLITE COMMAND FORM

1. rule:

..... ^
 ! ♥ ^

 please action

example:

..... ^
 ! ♥ ○ □

 Please read.

3. SYMBOL INDICATORS TO INDICATE TENSES AND THE MODAL AUXILIARY "MAY"

TENSES:

C.K. Bliss has designed a grammar block to be included on symbol displays as soon as the student is ready to begin learning the "time" symbols and/or to indicate tense.

) >	)(><	(<
past ago	present now	future then
>	^	<
make action in the past	make action in the present	make action in the future
> ^	^ ^	< ^
did, done	do, does	will do
> ⊙	^ ⊙	< ⊙
was, were	be, am, are, is	will be
> ±	^ ±	< ±
had	have, has	will have
?	^ △	-!
may	make, makes	not

Only the past and future tenses are marked; the present tense is unmarked, leaving the action indicator unchanged. Within the grammar block, the three forms are given for the verbs "to be", "to do" and "to have". For other verbs, the past and future tense indicators must be pointed to as well as the verb.

The tense indicator is always written above the verb, replacing the

action indicator in the case of the past and future tenses. For example

present: 
I see (the) man.

past: 
I saw (the) man.

future: 
I will be seeing (the) man.
(will see)

See page 51, How to Draw Blissymbols, for instructions as to size and positioning of tense indicator when recording a student's output. The student can be taught to point to the appropriate tense indicator immediately before pointing to the verb, to point to the tense indicator at the beginning of the sentence (to have general application to all verbs in the sentence), or to point to the tense indicator following the verb. The most common method appears to be that of pointing to the indicator immediately before the verb. The instructor should decide upon the most suitable order of pointing sequencing for each student, depending upon the long term objectives for symbol communication and the physical capabilities of the student. Pointing to the indicator before the verb allows the listener to achieve a tense set for processing the verb symbol; pointing to the indicator following the verb allows the student to think of verb endings in preparation for adding "ed" "ing", when he moves to English output; pointing to the indicator once only at the beginning of the statement reduces the number of movements required by signalling that all verbs which follow should be translated in the tense indicated at the outset. The procedure which the student uses

should be described in the instructions to the listener (See Program section, page 145).

For further examples of the possible translation of the verb forms, see Appendix 2 (a).

MODAL AUXILIARY "MAY" (to express possibility):

The small-sized question mark appearing as an indicator over a verb is translated as "may" or "might". (See Appendix 2 (a).) For example:

1. 
I may have done it.
(might)
2. 
She may see him.
(might)
3. 
He may make it tomorrow.
(might)

4. EXTENDED SENTENCE FORM

Within the system of Blissymbolics, symbols have been created for both content words (for example nouns, verbs adjectives) and function words (for example articles, prepositions, conjunctions). (For report of their usage during the Evaluation Study, see Vocabularies Section, Evaluation Study p. 37). In the sentence forms presented by C. K. Bliss, symbols for function words are for the large part omitted; only those judged as absolutely necessary for correct interpretation of meaning are recommended.

(See Semantography, pages 421-448). Many factors will have to be considered by the instructor in deciding whether or not to follow Bliss' suggestions in this regard. Some of the necessary considerations include:

THE PRIMARY PURPOSE FOR WHICH SYMBOLS ARE BEING TAUGHT:

Is Blissymbolics serving as a communication medium to be used as effectively as possible and to help develop language competency or is the primary objective to support specifically the user's native language growth? Is the focus on augmenting the user's total communication capability or upon extending his native language capacity?

If the student will be relying primarily on Blissymbols as his lifetime means of communication, he should learn to use the system as effectively as possible. This means he will strive for as concise an output as can be functional. If, however, the student will gradually move from Blissymbols to English as his prime interpersonal communication mode, it may be more appropriate to use an expanded Blissymbol output, patterned as much as possible after English order and including more function words than would be required for pure Blissymbol statements.

THE PHYSICAL CAPABILITY OF THE SYMBOL USER:

Is the student able to point precisely and without extensive effort to a large number of symbols or is he restricted in the number of symbols he can indicate in a given time period? Should the objective be for his communication to include redundant¹ syntactic and semantic information or to be composed of carefully selected meaning units of "content" symbols?

¹Redundancy: whenever information is duplicated by more than one source. For discussion of redundant sources of information in reading, see Frank Smith, Understanding Reading, Holt, Rinehart and Winston, Inc. 1971, pp.19-23.

If the student is capable of pointing, the instructor will be free to consider a wide range of factors to arrive at a decision regarding usage of extended sentence form. If however, the student's physical capability is extremely limited, the instructor will likely be strongly influenced by this restriction and will reject an extended sentence form in favour of a more telegraphic output style which efficiently uses content units. The severely disabled student must develop an awareness that the amount of time required for his message to be transmitted will strongly influence whether or not he will be given the opportunity to communicate widely. He then must learn the degree of information which can be transmitted by one or a small number of symbols utilized within different contexts. Using this knowledge, he can work toward an effective concise form of output.

THE INTELLECTUAL ABILITY OF THE SYMBOL USER:

Is the student intellectually capable of generating a long sequence of meaningfully related symbols? Or conversely, does the student have the ability to skillfully select and sequence a small number of symbols capable of transmitting the desired information?

In both instances, skill in independently generating and making decisions about the nature of the utterance is required. If the intellectual ability of the user is limited, neither style of output would be appropriate and the most effective approach could be an intermediate position of working toward short sentences which follow native language patterns.

THE LEVEL OF RECEPTIVE LANGUAGE OF THE SYMBOL USER:

At the time of symbol introduction, has the student developed beyond the early language stages with regard to his receptive capability or is he learning symbols during the formative period for receptive processing of his native language?

Consideration of the student's chronological age, in relation to his receptive language and intellectual level, will guide the instructor in defining the primary purpose for symbols. The older the student, the more likely symbols will serve primarily as a communication vehicle rather than as a contributor to language development, and the less there is need to model English patterns. For the young student, a sequencing of symbols which mirrors the surface structure of his native language may be desirable in order to develop native language patterns through expressive usage of symbols as well as through receptive processing of his native language.

THE EXPECTATIONS WITH REGARD TO FUNCTIONAL SPEECH:

Are symbols being used to complement, and hopefully lead to, functional speech?

If symbols are being used as a temporary adjunct to speech and there is a favourable prognosis for functional speech in the future, extended sentence form could be desirable. A higher usage of symbols representing function words to accompany and clarify speech utterances would then be encouraged. Individual needs must always be kept in mind, however, and for some students who utilize Blissymbols and supplement speech, symbols may be required only to accompany and clarify those non-function words which cannot be readily identified. In these

instances, little use would be made of symbols representing function words and extended symbol sentences would not be appropriate.

THE SUPPORT, FAMILIARITY WITH BLISSYMBOLICS, ACHIEVEMENT EXPECTATIONS AND TIME FOR INTERACTING OF THOSE IN THE SYMBOL USER'S ACADEMIC AND RESIDENTIAL ENVIRONMENT:

If the student has the opportunity to communicate frequently with responsive, knowledgeable persons, refinement of symbol communication utilizing Bliss' recommendations regarding conciseness can be an achievable goal. If the student is surrounded by persons with little time and little interest in exploring an alternative communication system, he will have little exposure to Blissymbol patterns and therefore, he will have limited opportunity to learn Blissymbol syntax. In this environment, it is also likely that he will be accepted more readily if he follows his native language patterns closely. Listeners who respond solely to the words appearing under the symbols are less threatened if few innovations, (that is, deviations from the native language pattern) are presented. If native language patterns are used, the student must be taught to guard against too lengthy sentences. If he produces long symbol utterances, he may frequently be given insufficient time to complete his statements. It is encouraging that the novelty of Blissymbolics can intrigue staff who previously have not been motivated to interact with non-speaking persons. (Harris-Vanderheiden, 1975). The challenge for the instructor is to develop in potential listeners an appreciation of the system, utilizing their initial curiosity.

Throughout the instructor's deliberations about syntax, she should be aware that her own stage of knowledge and confidence with regard to the symbol system will affect her decisions. Initially she may feel more secure following familiar native language patterns. If, however, the goal for her students is efficient communication and effective use of Blissymbolics, she should give serious consideration to utilization of the Bliss sentence forms. They offer the intuitive insight of the originator of the system. Until a generation of symbol users develops functional alternatives, the Bliss sentence forms can provide an effective operational syntax model.

Further assistance in decisions regarding syntax can be derived by referring to Models One, Two and Three described on page 89. If Model One is appropriate, and if the symbol user is intellectually average or above, utilization of Blissymbolics syntax could serve as an enrichment experience contributing to cognitive development. Brown (1973) has hypothesized that "important reasoning processes are dependent on sentence construction" (p. 38). For the student who has developed competence with native language patterns, experience with the sentence structures of Blissymbolics could be considered as extending both communication and intellectual capabilities. Model Two for the beginning student would suggest reference to English syntax during the early stages of symbol instruction, possibly transferring to Model One and Blissymbolics syntax, if the student continues to advanced symbol usage. Instructors using Model Two would be following the stages of speech development of the speaking child, presenting through their symbol communication with the child, symbol sentences at the level above the child's expressive level. Within Model Three, the syntax model presented would likely be a composite, primarily influenced by the concise Bliss model but with adjustments to accommodate well-established native language patterns.

It must be emphasized that the Bliss syntax model has been presented and recommended for use by instructors because of the student's need to first receive consistent symbol communication before he can experiment with and evaluate alternate forms. Through those responsible for instruction presenting a consistent model, students are given a foundation from which they can refine Blissymbolics into an even more functional communication system. It is not intended that students be required to adhere rigidly to the sentence forms presented. It is hoped that instructors will begin by using these forms and then, with the student, explore more communicatively effective alternatives. It is interesting to speculate that the more the symbol user explores and expands Blissymbolics, the more extensive becomes his communication capability. His becoming "widely and flexibly adapted" has application in two dimensions. First, the student must be prepared to utilize immediate cues, when necessary, to support symbol communication with persons lacking any knowledge of Blissymbolics. Gestures, environmental clues, facial expression, vocalizations, spelling, etc. (the non-symbol strategies), added to the listener's reading of the words under the symbols, enable the symbol user to be understood by even the novice. In a different way, the competent symbol user can adapt his communication "widely and flexibly" with experienced symbol persons. Through creatively exploring and developing symbol strategies and syntax, he can communicate both directly and in recorded form in a manner beyond the confines of his native language mode. He may even communicate beyond the cultural and language restraints of his immediate social environment. Correspondence between symbol users of different language backgrounds has already begun. One would speculate that as they become proficient in the system, non-speaking persons will use it well beyond the ways dreamed of by Bliss.

5. INPUT FROM INSTRUCTORS IN EVALUATION STUDY
RELATING TO SYNTAX (UTILIZING EARLY SYNTAX MODEL)

Symbol usage during the period of the study - December 1974

to December 1975 was strongly influenced by two factors:

- (a) The relative inexperience with Blissymbolics on the part of symbol instructors (see Appendix 4 (a), Evaluation Study, Table 32).
- (b) The syntax model presented to students - that outlined in two publications which are now out of print: the 1972-73 Year-End Report and the First Edition of the Teaching Guideline, (Sept. 1974). The syntax model revision (which appeared in Syntax Supplement No. 1) was not available to the research instructors in time for it to affect research data. The major difference between the two models was (1) the positioning of verb indicators over the verbs in the later syntax model, rather than before the verb, as in early publications and (2) the use of an unmarked present tense in the revised syntax. (see Appendix 1)

Instructors participating in the Evaluation Study were questioned as to their objectives with regard to SYNTAX. The first generalization which can be made from their responses is that they wanted to be sure SYNTAX would be "kept in its place". Statements such as:

- (a) Don't restrict output by concentrating on syntax;
- (b) Be sure to be in keeping with student's developmental level;
- (c) Only spend time on it when student uses 4 or 5 symbols;
- (d) Don't worry about it until student is using 200 symbol board and his communicating skill is firmly established;
- (e) Syntax should be considered individually with each child. Expectations should be "complete sentences grammatically 'correct' for higher (intellectual) level; for lower (intellectual) level, accept what child can handle conceptually."

reflect the desire by instructors to avoid drill and not to place an emphasis upon form to the exclusion of semantics.

Secondly, instructors emphasized the functional purpose of syntax:

- (a) To be able to communicate fully, the symbol-user needs syntactical order;
- (b) To make corrections when listener mis-translates an utterance;
- (c) To use all parts of speech, that is to utilize the full capability of the vocabulary;
- (d) Need symbols in appropriate order to make message understood;

- (e) Order should be refined to point where persons other than teacher can understand; emphasize actor, agent, descriptive;
- (f) Teach enough syntax so meaning comes through.

Lastly, some instructors cautioned:

- (a) Don't restrict output by concentrating on syntax;
- (b) Be aware that expression becomes more formalized when program is syntax oriented.

Further insight as to the instructor's attitudes toward syntax was derived from asking what factors they considered in selecting the student's "best" output. Many of their responses related directly or indirectly to syntax:

- (a) Very complete sentence;
- (b) Syntactically full;
- (c) Used symbols in "proper" order;
- (d) Sophistication of components - order, length, intelligibility;
- (e) Length of utterance;
- (f) Syntactic complexity;
- (g) Completeness of message;
- (h) Following pattern of model presented;
- (i) Parts of speech used.

The other factor revealed by their comments as heavily influencing their evaluation of "best" was the originality of the utterance:

- (a) To be creative in using the symbols available;
- (b) Any spontaneous output;
- (c) Use of strategies;
- (d) Symbols that weren't prompted;
- (e) Content of symbols;
- (f) Semantic meaning and level of abstraction.

It is interesting to note that no instructor said directly that an utterance was chosen as "best" because it followed English. It would be useful, to pursue further the meaning of "proper" and "correct", for experienced instructors.

Throughout the Evaluation Study the many questions asked by instructors with regard to symbol sentence structure made it apparent that there is much still to be learned regarding Blissymbolics syntax. Studies, to examine the symbol usage of competent symbol-users, are needed. Only through wide experience and the responsible development, testing and documentation of new effective symbol sentence forms will a refined and comprehensive syntax emerge.

C. How to Draw Blissymbols

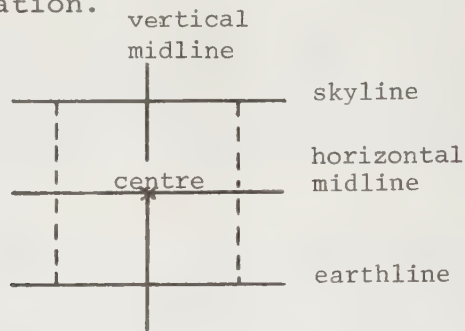
Correct spacing, proper positioning, exactness of drawing and of size are all important; care taken in the drawing of symbols will contribute to the fluent reading of symbol communication.

In order to draw symbols in their proper size relation, remember that most single symbols fit into a basic square, with the base of the square at the earthline and the top of the square at the skyline. When a particular symbol element protrudes over the skyline or under the earthline, a special meaning is intended. It is important to note that the 'square' referred to in the drawing of symbols is not the total space on the symbol displays, which contains the symbol and word; rather, it is the space within which the symbol elements are positioned. This square can be mentally subdivided horizontally and vertically to make drawing easier and more precise. The instructions given here can be accommodated to free hand drawing as well as to the use of aids (e.g. squared paper, templates, See p. 57). Symbols drawn for instructional purposes or for display boards, should always be done with exactness, retaining their proper size relationship.

IN ORDER TO DRAW SYMBOLS ACCURATELY:

Based on your requirements, choose the size of the basic square. Maintain **this size throughout** a specific project.

Divide the hypothetical square into halves, both horizontally and vertically and use the terms shown in the illustration.



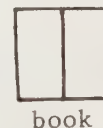
In drawing each symbol, think of the portion of the square to be used, both horizontally and vertically. For the positioning of each symbol, think of its location with reference to skyline, midline, earthline.

EXAMPLES:

An *enclosure* uses one full square both horizontally and vertically, with the base falling on earthline, the top falling on skyline. A *paper* or *page* uses 1/2 of the full square, horizontally, and uses the full square vertically.



A *book* uses one full square, horizontally and vertically and has a vertical line through the centre.



A *thing* uses a half of the full square horizontally and a half of the square vertically. It is located in the centre of the full square, midway between skyline and earthline.



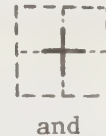
THE IMPORTANCE OF POSITION:

The same symbol may be positioned in different ways,
(e.g. *belongs to*, *and*, *with the help of*).

Belongs to is a 'plus' sign using
a half square horizontally and a
half square vertically. It is centred
on the earthline.



And (also) is a 'plus'
sign using a half square horizon-
tally and a half square vertically.
It is located on the horizontal
midline.



With the help of is a 'plus' sign
using a half square horizontally
and a half square vertically. It
is centred on the skyline.

THE IMPORTANCE OF SIZE:

The symbol for *sun* is a large
size circle, using the full
square horizontally and verti-
cally.



Mouth is a small circle using half
of the full square horizontally
and half of the square vertically.
It is located in the centre of
the square, midway between skyline
and earthline.





In the symbol for *man* the small size *action* symbol uses a half square horizontally and a half square vertically. The total symbol for *man* occupies a full square vertically.



In the symbol for *woman* the small size *creation* symbol uses a half square horizontally and a half square vertically. The total *woman* symbol occupies a full square vertically.

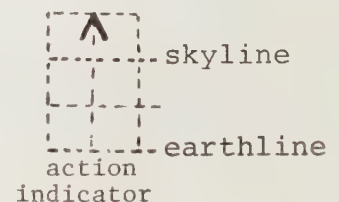
The verbal noun, *action*, uses a full square horizontally and vertically, with the apex located at the skyline.



The noun *activity* rests on the earthline, and uses a half square horizontally and a half square vertically, with the apex at the midline.



The *action indicator* begins a quarter square above the skyline. It is a quarter square wide and a quarter square high.



THE IMPORTANCE OF SPACING:

Combined Symbols:

Between each symbol in a combined construction there must be a space equal to 1/4 of a full space, measured from the furthest extension of the symbol NOT from the boundary of the square in which it was positioned.



Human (who) gives out
knowledge (store of
thoughts).



Language: mouth and ear
Electricity: outline of
lightning.

Sentences:

A full square separates the symbols in a sentence.
 The blank square is measured from the extreme
 right-hand limit of the first symbol to the extreme
 left-hand limit of the second symbol.

Note:

In the vertical dimension, the position of a symbol is fixed in relation to the earthline and skyline, i.e. it does not move up or down.

In the horizontal dimension the position of a symbol is movable, and is determined by its relation to other symbols.

III PHYSICAL FUNCTIONAL CONSIDERATIONS

D. Drawing Blissymbols with a Template

Mr. Bliss has suggested that the best way to draw symbols is by using a transparent plastic strip with the basic shapes cut out. Following this advice, a template was made and the authors spent many hours teaching themselves to use it accurately. It is hoped that the following hints will be of assistance to the reader.

Before beginning review the basic facts about the drawing of symbols outlined in the previous section. Remember that most symbols can be based upon a square subdivided into quarters. Define an earthline and a skyline or use paper to insure that the symbols are accurately drawn.



Fig. 1 Earthline and Skyline

To draw symbols use a ballpoint pen or a quick drying felt tip. Face the outer margin of the underside of the template with masking tape. This will raise the template slightly above the surface of the paper and prevent smudging of the drawings.

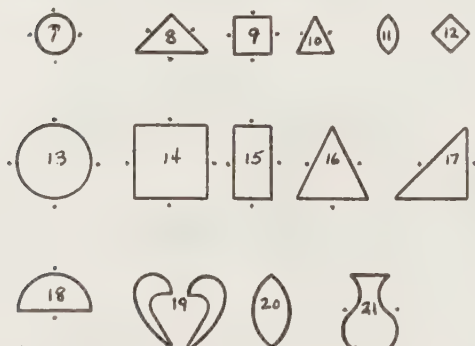
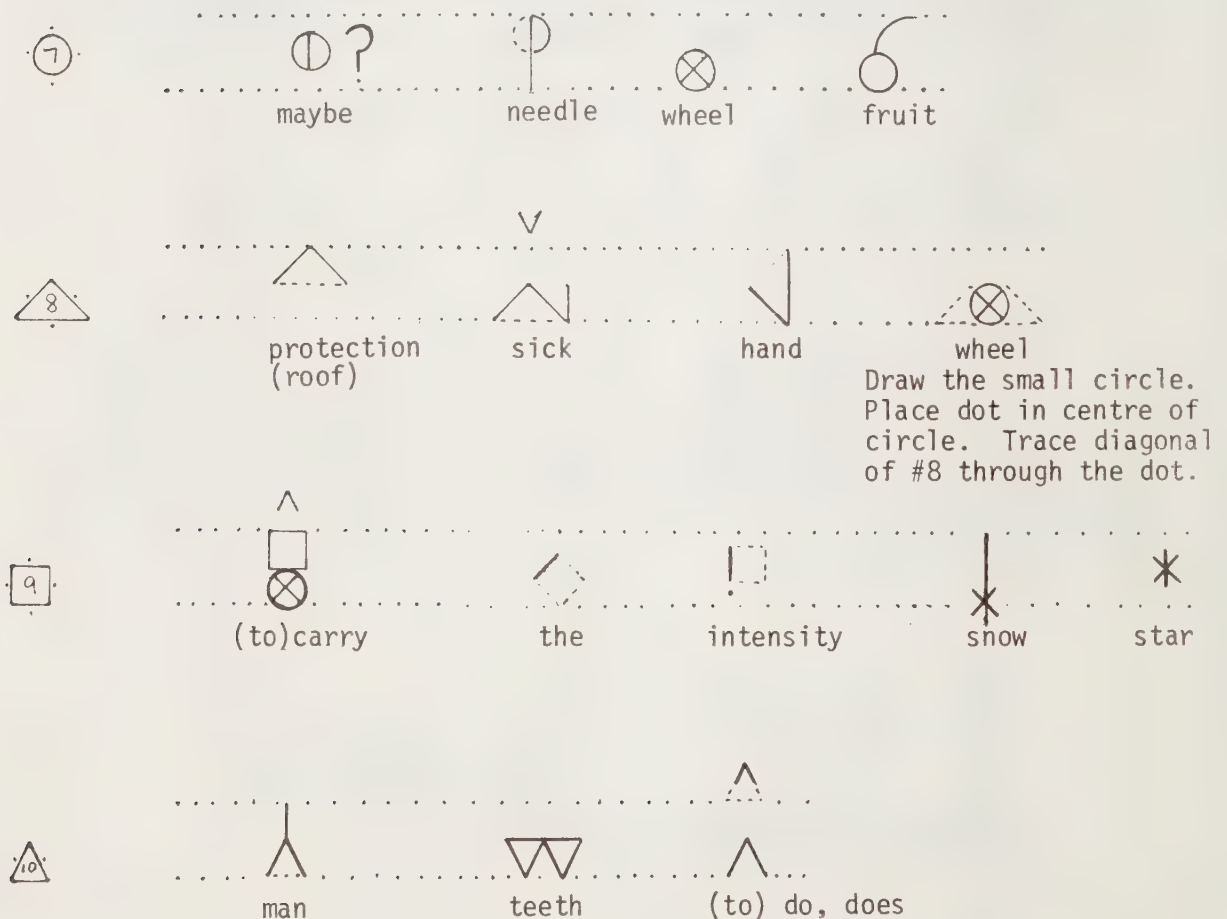


Fig. 2 Shapes produced by using the small template

Note: numbering corresponds to a large scale template having more shapes than the one illustrated.

Place the template over Figure 2 and mark all the dots with a permanent marker. These marks will help one to remember the 2 x 2 matrix in which one is working. Often only part of a shape is needed. Start at the dot and draw into the corner whenever possible. This helps to keep the drawing of the symbols accurate.

In the following examples the dotted lines indicate the part of the shape not drawn. It is useful to note its position. For example in #10 when part of the triangle is used its base line rests on the skyline, placing the action indicator the correct distance above the symbol.



11



bread



now

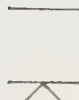
12



up



for



floor



not

13



(to) know



time



weather

It is easier to draw
the square base before the circle.

If dots are marked the remaining
part of the symbol can be added.



window



thick, fat ⑧



body



clothing



house



chair



God



air



(to) walk, go



(to) fight



Blissymbol



mountain



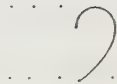
tree



grass



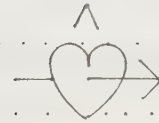
fish



ear



news



(to) love

To construct the heart, trace around the outside edge of the left shape, then slide the template to the left so that the right hand shape matches with the points of the outline



present



(to) save



fire



medical



water



(to) wash

draw semi-circle first

Templates can be made in various sizes and it must always be remembered that the same sized template must be used throughout one piece of work. The size of the shapes has meaning.

When teaching a new symbol use a large template and draw the symbol with the child, explaining each part. For all word cards, flash cards and work to be displayed on the walls, use a template. At other times, recording the children's output or writing news home, draw the symbols freehand and forsake some neatness for speed. It is definitely slower to use a template but the accuracy and clarity of the finished product outweighs the time taken.

With use, one will soon discover many more ways to use the template and improvement in speed and accuracy will also be noted.

These practical instructions for drawing symbols with a template are the work of Jill Hammond and Patricia Bailey, of Heathfield School, Fareham, Hants, England.

A. Positioning and Handtraining
Towards Symbol Usage

1. WHAT WE SHOULD KNOW ABOUT CEREBRAL PALSY

All of us involved in a program for the severely handicapped cerebral palsied child with communication problems should have a basic understanding of the physical problems influencing these children. We should be aware of the most frequently occurring reflexes and how we can influence muscle tone. Lack of functional speech is only one part of a much larger picture. Through correct positioning we are able to help the child function more effectively in all areas. It is felt that training the child to use his hands in order to use symbols is far superior to using any other part of the body (such as a head pointer or eye glance).

A normal new-born child demonstrates a number of primitive reflex patterns and slowly develops motor patterns that replace these reflexes. In each stage of development, even in adulthood, specific reflexes are manifested. For example, when touching a hot plate, the withdrawal reflex quickly removes a hand, preventing it from being burned; or when falling, the protection reaction will occur. As a result of brain damage, the cerebral palsied child cannot develop the motor patterns to replace the primitive reflex patterns and does not progress to a higher developmental level.

MUSCLE TONE:

Also related to the brain damage is abnormal muscle tone. Normal muscle tone allows a smooth flow of movement. However, if the tone is too low, the posture appears floppy. If the tone is too high, the muscles are tight. A fluctuating tone

is manifested in jerky movements. In a very young child (2-3 months old) when all the primitive reflexes are usually still present, one can detect cerebral palsy by the presence of abnormal muscle tone. The baby seems to be either very floppy and lies placid on his back or the baby feels tight or stiff and his hands are clenched in a fist. Depending on the location of the brain damage, the child will become athetoid and his movements will be exaggerated and jerky (as a result of a basic low muscle tone which fluctuates during activity), or spastic and his movements will be slow and stiff (as a result of high muscle tone), or the baby will become ataxic and have poor balance and uncoordinated movements.

OTHER PROBLEMS RELATED TO CEREBRAL PALSY:

Children with cerebral palsy may vary in intelligence and may have associated handicaps affecting vision, hearing and speech. In many cases the chronological age does not correspond with the motor developmental age. Therefore, a child of seven may not have progressed beyond the reflex patterns of a very young baby and, for various reasons, including lack of social and physical opportunities, is behind his chronological age in mental development also. When observing a young child, notice how much this child practices every movement, receiving a lot of perceptual information. The cerebral palsied child is limited to a few uncontrolled stereotype movements from which very little new information can be obtained. One must be aware of this factor when training a child towards electronic equipment or just finding the location of a symbol on his tray. Many of the cerebral palsied children have perceptual problems and frequently lack a normal sense of direction. It seems that spastic children who dislike move tend to have more perceptual problems than do athetoid children who have a lot of overflowing movements.

SOME OF THE MOST DISTURBING REFLEXES AND REACTIONS
WITH REGARD TO CEREBRAL PALSY

ASYMMETRICAL TONIC NECK REFLEX (A.T.N.R.):

When the child turns his head to the right, the right arm will extend and the right leg will show some extension. The left side goes into flexion. By turning the head to the opposite side the pattern occurs in reverse. When this reflex predominates, the child is unable to bring his head to the mid position nor can the arm cross the



Fig. 1 Asymmetrical
tonic neck
reflex

midline. Because of extensor spasm in the neck, the child often cannot see where he is pointing. As the arm is extended towards the face, the hand cannot be brought to the mouth and self-feeding is impossible. It is important to know that a child "locked" in this reflex is unable to function, (Figure 1.)

What can we do to help this child?

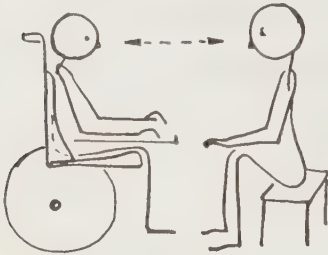


Fig. 2 Eye level

- (a) Never approach this child from the side when talking to him. Face the child directly and, whenever possible, work with him at his eye level, (Figure 2.)



Fig. 3 Counteracting
spasm

- (b) If a spasm occurs (Figure 3) and the child cannot "unlock" his reflex, try crossing his forearms over his chest by placing each hand on the opposite shoulder, placing the thumb on the front part of the

shoulder and wrapping the fingers around the arm. When you feel the spasm start to ease off, slowly release the hands and place them in front of the child.



Fig.4 Stabilizing

- (c) Some children feel more stable and secure when their hands are placed between their legs (Figure 4.)

EXTENSOR THRUST:

Many of us have seen the child throwing his head backwards and tending to slide out of the wheelchair. When we try to stand these children on their feet, the legs cross and only the toes touch the ground. The child feels stiff. This reflex is predominant in standing or lying on the back, but can be elicited in the sitting position when the head is in extension. The extension pattern of the upper extremities is: pulled back



Fig.5 Extensor Thrust

shoulders, flexed (bent) elbows and fisted hands (Figure 5.) It is typical that children with a strong extensor thrust have their mouths open all the time and are heavy droolers. Most children with a strong extensor thrust can be helped through special positioning in an adapted chair.

Working Position:

Usually the child has to be slightly reclined (an upright position can elicit thrust) and the head brought forward to facilitate mouth closure. Hips and knees should be in flexion and the feet at right angles to the legs. To hold the child in this position a pelvic band, like a



Fig.6 Counteracting

seat belt in cars, is essential. Trays have to be placed as low as possible. The person working with this child should also be facing him and should be as low as possible, (Figure 6.)

Additional means to relax the child:



Fig.7 Pressure points
for relaxation

- (a) Apply pressure with one hand on the child's sternum. This will bring his shoulders forward and head into flexion. Place your other hand, when necessary, into the groin of the child. This will encourage hip flexion (Figure 7).

- (b) These children often benefit from being placed on an "inclined (prone) stander" (Figure 8.) This stander can be placed at a table or a desk and for fun activities at a sandbox or at a watertable. There are certain rules to be observed when placing a child on a prone stander. The chest panel of the stander has to be V-shaped to support just the boney part of the sternum (not too high, which could stimulate a gag reflex, (and not too low, which would not give enough support). If the panels are too wide and touch the shoulders, this will stimulate an extensor thrust. Also important is the location of the strap - have it placed over the child's buttocks. It should prevent the hips from flexion and give the child a secure feeling of support. The feet should be placed at a right angle to the legs on a footplate with the heels taking some of the body weight. We have observed that children in a stander have better head control than when sitting and often start to vocalize. Some speech therapists take advantage of this position and use it also for feeding. It is a useful position because it brings the arms forward and to the midline and facilitates hand activities.



Fig.8 Inclined (prone) stander



Fig. 9 Flexed wrist,
extended fingers

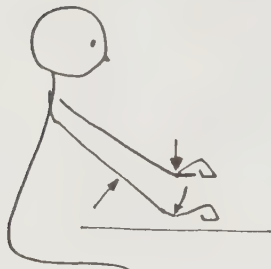


Fig. 10 Pressure
points



Fig. 11 Finger pointing

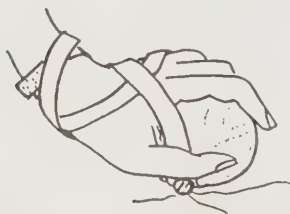


Fig. 12 Ball holding crayon

Hand Function:

As we have seen before, while the child is in his extensor pattern, the elbows are flexed and hands are fisted. Now, when we break this pattern, the shoulders are flexed forward and the elbows are extended. The hands often over-compensate with a flexed wrist and extended fingers, and consequently pointing to symbols is made very difficult, (Figure 11.) This can be overcome by applying pressure to the wrist and letting the child use a fist for pointing, (Figure 12.) By constant use of fists for pointing to symbols one will observe that the child, after a while, feels secure enough to free one finger for more accurate pointing, (Figure 13.)

Activities:

A child in the stage of using his fists can be involved in different activities. He can play with cards, push blocks or paint pictures. One can place a little ball holding a crayon into the palm of the hand, (Figure 12.) This enables the child to

have a better grip on a crayon. However, if the child is unable to hold onto it, a strap can secure the crayon or pencil.

Head Position:

There is one other important feature of children with strong extensor patterns to be observed: there is one point on the back of the head which, when rubbed against a surface, will elicit an extensor pattern, (Figure 15.) When the head is in extension, mouth closure is impossible, drooling is increased and feeding is made

difficult. The head position will also influence reflex response and body posture; for example, when the head is extended, the extensor pattern in the whole body will be predominant.

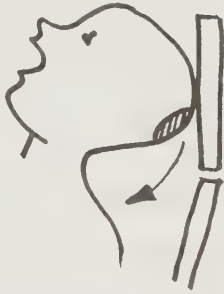


Fig. 13a Head in extension



Fig. 13b Proper positioning

FLEXOR WITHDRAWAL REFLEX:

Total Flexion:



Fig. 14 Flexor position

Predominant flexor children tend to have their heads always bent over and do not seem to pay any attention to their surroundings. Their backs are rounded, shoulders and elbows are flexed and hands are fisted. It is difficult to stretch out their arms and open their fists. Flexor children often have a high muscle tone with a lot of spasticity, (Figure 14.)

Working Position:



Fig. 15 Correct positioning for flexor children

Flexor children also have to be slightly reclined in their chairs. Often they require only a neck rest and their hips do not need to be flexed as much as for children with extensor thrust. It is important to have the working surface elevated far enough so that the child has to stretch out his arms in order to reach the symbols, (Figure 15.) Trays can be made in such a fashion that they can be lowered for other activities.



Fig. 16 Inclined stander

Flexor children can also benefit from an "inclined stander", but this child needs more padding under his chest to raise the shoulder girdle (Figure 16.) The stander is more erect than is necessary for the extensor child and again books or symbols are elevated. In this position the child can paint, using a brush or fingerpaint.



Fig. 17 Fist

Hand Function:

Some children's hands are always fisted and difficult to open (Figure 17.) By pulling one finger after the other out of the clenched hand, you will only increase spasticity. The key point to opening a spastic hand is to manipulate the thumb in a particular way (Figure 18.) Get a good hold of the proximal joint (base) of the thumb and try to rotate it outwards so that the inner palm flattens (Figure 19.) This should help open the other fingers as well. In this position (holding on to the proximal joint of the thumb) vibrate the hand and forearm (by shaking). This manipulation stimulates the extensors and should release the spasticity in the flexors. In order to de-sensitize the palm of the hand, let the child's hand glide over different textured surfaces (clothes, tray, wood, etc.) while you maintain your grip on his thumb (Figure 20.) This should be done only when the hand is relaxed.



Fig. 18 Thumb manipulation



Fig. 19 Flattening of palm



Fig. 20 Desensitizing

STARTLE REACTION (The Moro Reflex):

This reflex is usually observed in children who are hypersensitive to noise and touch. When present, it is one of the most disturbing reflexes interfering with symbol communication. Addressing a word to the child can elicit a startle reaction. Any noise in the room will cause the same response. These children also have enormous difficulties operating an electronic device, in that they are hypersensitive to touch. Each time they want to reach out to operate an interface, they have to fight their startle reaction and often are unable to overcome it. Many electronic devices have proven to be ineffective because the child could not overcome his startle reaction.

What Happens When a Startle Reaction is Elicited?

There are two different movement reactions observed:



Fig.21 Typical startle reaction

- (a) The most common or classic reaction is an extensor pattern in the upper extremities and a flexor pattern in the lower extremities (Figure 21.) This means the child will throw his arms backwards and his knees up. The banging of knees on the wheelchair tray is due to the Moro Reflex. Often when

the child wants to do or say something or is just thinking about it, his knees will react. Athetoid children more often have this kind of startle reaction.

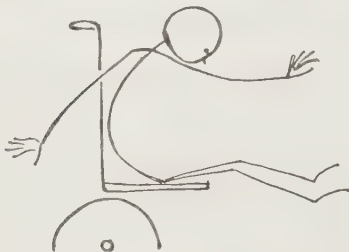


Fig.22 Alternate startle reaction

- (b) Some children have a different reaction to their Moro Reflex: their arms will fly out with extended elbows and their knees will extend (Figure 22.) Anyone standing near this child will get hit by his feet or when standing beside him will be hit by an arm. After a startle reaction,

it takes time for the child to relax and to be able to concentrate again. Spastic children more often have this kind of startle reaction.

How can we assist these children?

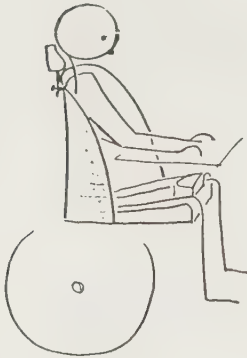


Fig. 23 Correct seating

- (a) For the child who manifests an extensor pattern in the upper extremities combined with flexion in the hips and knees (characteristically found in children who bang their knees) it is essential that the shoulders be well padded and rounded forward. An abduction block (pommel) between the legs with a pelvic strap will insure that the child will not slide out of the chair, (Figure 23.)



Fig.24 Moulded seating

- (b) Some children exhibit almost the opposite of this reaction (i.e. arms extended, abducted and to the side while the legs, hips and knees are in an extended pattern) causing rounded backs. They sit on their coccyx (tailbone) rather than on their buttocks. Strapping alone will be of no help. The seat must be moulded carefully around the buttocks, the back well supported. The lap tray should be elevated, (Figure 24.)

Even in a well constructed seat, the child will still startle, but the reflex will not complete its pattern and the child will soon settle down again. One's attitude towards these children is just as important as seating. Loud, sudden noises should be avoided; speak firmly but softly. However, a person working with these children should be advised to avoid an over protective attitude and not to treat the cerebral palsied child like a little baby. One must try to desensitize the child. One should work with these children in a completely quiet room until they feel confident and secure. Then they can be moved into a room with other children, but placed in a quiet corner until ready to join their peers.

B. Physical Assessment and Recommendations

In order to establish the most effective means of communication, it is necessary to carry out a physical assessment. It is essential to look at the whole child in every aspect, because all his areas of functioning are linked together -- physical, mental and social -- and they influence each other.

In order to gain a clearer understanding of the child's physical status, his muscle tone and predominant reflexes must be identified. Observing the child at rest gives an indication of basic muscle tone. He may be relaxed and rather floppy (low tone) or may be tight and feel stiff (high tone). When the child tries to do something, his muscle tone may change or fluctuate. One also observes his predominant reflexes during these periods. Only those reflexes that interfere with the program should be taken into account, e.g. a predominant asymmetric tonic neck reflex, or an extensor thrust or total flexion (see previous section). It is also important to know how much the child is influenced by startle reactions. The child's best working position must then be established. As most children involved in a communication assessment are severely handicapped and non-ambulatory, seating plays an important role. Only when a child is seated well, with good trunk and head control, will he be able to function.

Figure 1 does not illustrate the severity of this girl's handicap because her seat (Figure 2) is helping her control very strong extensor thrust and startle reactions. Without this seat she would be helpless and unable to function. Severe cases, such as she represents, need to be observed over a long period of time and different approaches must be tried in order to arrive at the best method of seating and communication.



Fig. 1 Seating
facilitates control



Fig. 2 Appropriate
seating

Most communication devices used as a substitute for speech involve some kind of pointing system to a visual display. Therefore, it is necessary to work carefully on positioning in order to inhibit pathological reflexes and facilitate arm and hand movements, which will in turn facilitate effective pointing. Using a hand or a finger for pointing is far superior to any other method, such as a head pointer or an electronic device. It is natural for the human to emphasize his thoughts with hand movements such as pointing. It seems also that communication becomes more spontaneous by direct physical hand contact with the written word or symbol rather than through an indirect device. Even though children may operate an electronic device more quickly, they tend not to use it if they have a choice, preferring instead to use a fist (which often involves more effort) or to indicate the wanted symbol with their eyes.

Children who are initially very involved in their upper extremities do seem to improve their hand skills eventually, through motivation to communicate. This is particularly so with athetoid children who seem to develop "trick" movement more often than spastics.

Some children have started to vocalize more freely while using the symbols. As the symbols became the focal point of interest, the oral muscles became more relaxed and vocalization is made easier. The same pattern of improvement has been observed with continuous opportunities to use the hands for pointing to symbols. Often when a child has something important to tell and is initiating the conversation, his pointing ability improves greatly. It is important to note, however, that when a child is given a specific question to answer, he may sometimes tense up to the point of being unable to perform. This pattern is more pronounced in children who have a startle reaction. It is important, when assessing a child, to be aware of this phenomenon as this "mental-physical" block can make accurate assessment very difficult. One must also recognize that children with these difficulties have had little or no opportunities to make use of their hands and therefore lack experience and training. Initially their performance will be rather poor and it takes time to find out their real potential. The child needs a lot of encouragement and support from those looking after him in order to relax and feel more secure.

1. TESTING POINTING ABILITY

The child's range of movement can best be measured by placing a grid, ruled in 1 inch squares, on his working surface. (See Figure 3).

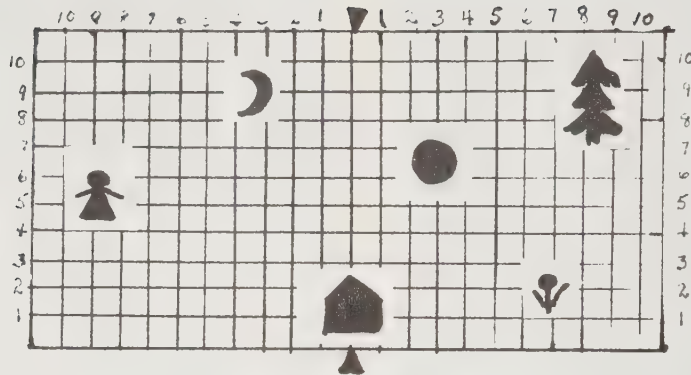


Fig. 3 Grid: to determine range of movement

(This grid can be made out of cardboard and can be laminated to be protected from moisture)

A grid makes it easier to identify the full range of the child's movement (reach) without having to use a tape measure. One can place different objects or pictures on this grid and use a grease pencil to mark the spot reached. This test gives different kinds of general information, such as:

- (a) Picture recognition;
- (b) Visual discrimination;
- (c) Eye-hand co-ordination;
- (d) Eye movement/pursuits;
- (e) Size of target (besides the range of movement, the accuracy of pointing ability to be measured).

The results of this assessment are of assistance in arranging the child's tray. If the test indicates that the child's target is gross, one has either to enlarge the actual size of each symbol or devise a coding system. (See Appendix 3.)



Fig. 4 Enlarged symbols for gross fist pointing



Fig. 6 Elevated board may improve pointing

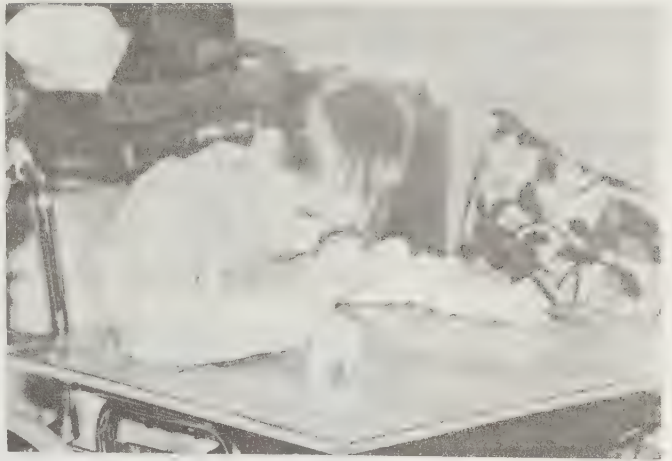


Fig. 5 Total flexor child

The child in Figure 4 has a very low tone athetosis with wide overshooting movements. At first he was able to point only with his fist to very enlarged symbols. During a period of three years he has become able to point with his index finger to a 400 symbol board. He is still basically using his fist, although he is able to free one finger (Figure 6, background). The child in Figure 5 is a "total flexor child". He has had difficulties in locating symbols on the board and also in pointing to them. As soon as his board was elevated (Figure 6, foreground), his performance improved greatly. One will notice a typical athetoid

pointing position of the hand; the index finger is stabilized over the thumb, thus freeing the middle finger. This position facilitates wrist extension and allows extension of the arm. In this position the child feels more stable and secure than pointing with his index finger.

2. TESTING EYE MOVEMENT/PURSUITS

Many of the severely involved children are unable to use their hands or fists for pointing. Often, however, they have reasonably good eye movements when the head is well supported. When testing eyes, one has to observe how they move according to a given situation. Does the child raise his eyes to indicate "yes" and lower them for "no", or does he move the eyes to either side for the same responses? Observe how clearly one can identify the direction in which the child is looking. Only when the eye movements are clear and defined will the child benefit from an "eye pointing" system, like the ETRAN or other coding systems. Sometimes it is beneficial to devise two different communication systems for a child. On a one-to-one basis and for more spontaneous conversation, an eye coding system can be used. In group situations, such as a classroom, the child should have another system with which he can work more independently; for example, an electronic communication board with a memory replay feature. If the child is using a headstick for typing, it is not recommended that it be used for pointing to a communication board. A headstick can give the child a great pleasure of accomplishment when used over a short period of time. However, when wearing this harness all day long, more spasms in the area of the jaw muscle can develop, the child generally becomes more spastic, and increased drooling with occur.



Fig. 7 Child with ETRAN system

Some experiments with a light beam attached to a headstick harness have been carried out at the Ontario Crippled Children's Centre. The idea was that the light source would follow the head movements and point to the symbol wanted (see Figure 8). This system was successfully used by two children with fair head control who had difficulties using a conventional headstick. However, this system needs further development so that the light is bright enough and approximates the eye movements more closely.

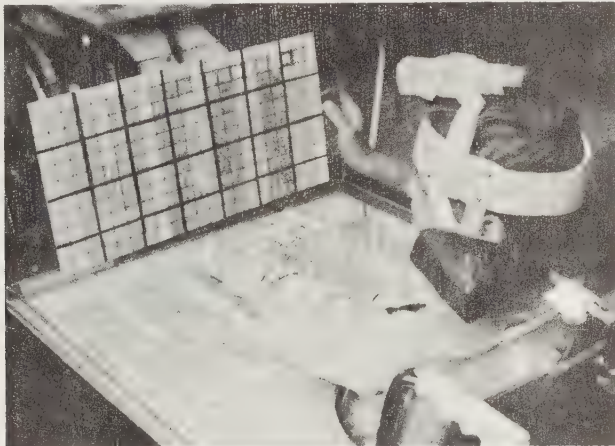


Fig. 8 Light beam pointer

3. MOBILITY

Observation of children with communication problems over the years reveals the fact that mobility plays an important part in developing overall communication skill. The normal young child gains experiences by crawling and moving around long before he can speak. He is able to explore, acquire internal language and make decisions. The severely disabled child, on the other hand, is often left in one spot and has no chance to explore by himself, nor can he orient himself in space. Important proprioceptive information, necessary for his development is not being established. Research, with both animals and people, has shown that being "pushed" through space does not result in learning spatial concepts.

In addition to this deprivation is the fact that a child who is not independently mobile is often passive and uninterested in learning and interacting with other children. Provision of recreational mobility, e.g. a tri-cycle specially built for C.P.s, not only lessens general frustration, but appears to improve spatial perception skills somewhat. It has been found in some cases that children who were given an electric wheelchair, have improved dramatically in all areas. Not only were there changes in sense of direction, social interaction, decision making and exploring, but also the pattern of sentence structure improved. The evidence is overwhelmingly in favour of giving a child, as early as possible, a mobility device. For the very young child perhaps one of the commercially available toy cars could be adapted. (See Figure 10.) At O.C.C.C. a castercart, originally designed for spina bifida children, can be provided for the very young child. (See Figure 9.) This cart enables the child to be near the ground where he can play at his natural play level.



Fig. 9 Caster cart



Fig. 10 Spider walker

Points to consider regarding mobility and communication:



Fig. 11 Portable display

- (a) When the child is capable of walking with or without an aid, his communication aid has to be portable and easily accessible. In Figure 11 the communication board is laminated and folded, so that it can be carried in a little bag.
- (b) When the child is only partially confined to his wheelchair and is able to get out of it by himself to crawl around, a special device has to be made for the wheelchair table which the child can operate himself, without interfering with his feelings of independence. A second communication board should be available on the floor within easy reach.
- (c) When a child is able to wheel his own chair, the corners of his tray need to be removed to allow him easy access to the wheels for pushing.
- (d) When a child is not mobile, the most suitable mobility device which will allow for maximum mobility both at home and at school must be considered. In choosing the right mobility device, one also has to determine whether or not the child has an opportunity in his home setting to receive the necessary training in operating the device.

If it has been decided that the child needs an electric wheelchair, the choice of the right model is important. One has to weigh the advantages and disadvantages of between the different models. For example, the Everest & Jennings micro switch power wheelchair is a heavy, strong wheelchair and the control box is suitable for

adaptations. The speed can be lowered for a slow ride. The driving mechanism can be easily unlocked, so that an attendant can push the child in confined areas. However, this chair is not easily transported and takes up a lot of space. Therefore, it is more suitable for schools and institutions than for a small home.

The BEC rear wheel drive power chair is much lighter and smaller than the E & J. The chair can be folded easily and transported by car. This wheelchair is good for someone who is an independent driver who would use it in a home setting. However, the driving mechanism is not easy to unlock and lock, and is not suitable to adaptations.

A common mistake is to order a power wheelchair that is too big. All sizes are now available. A chair can always be made bigger at a later date. (See Appendix 8.)

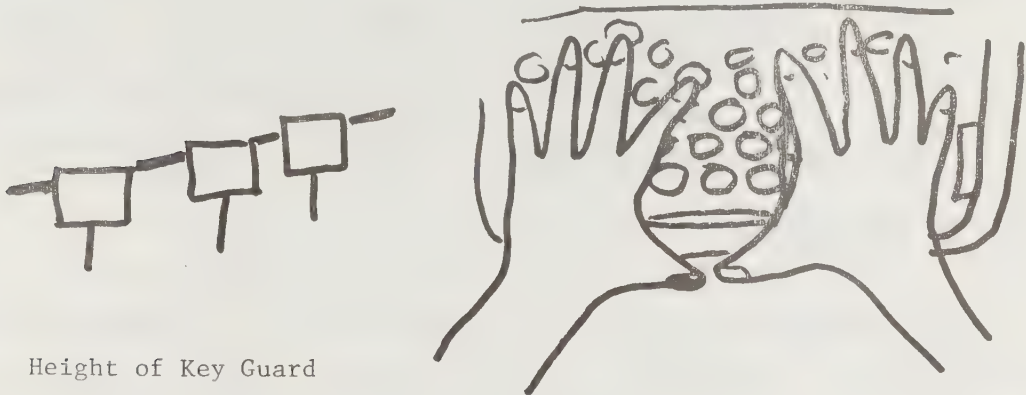
If a child is not able to use a standard control box, a special adaptation has to be made. However, this can only be carried out by specialized centres familiar with the problems. The same holds for other devices, such as a specially made C.P. tricycle or castercart.

4. WRITTEN OUTPUT

Use of the Blissymbol communication boards does not necessarily preclude from learning to write. Acquiring a means of written output is another step towards total communication. The child should be given the opportunity at a young age to scribble, even though the lines will be unco-ordinated. If necessary, the printing tool can be attached to the child's hand. (See the previous section, under Extensor Thrust.)

Most cerebral palsied children will not develop sufficient fine motor co-ordination for handwriting and will need an electric typewriter. This typewriter should be

provided with a special guard to prevent depressing of unwanted keys. It is important that this guard be set at the right height. One should be able to stroke over the keys without typing a letter and also not have to bend the finger too much to depress a key. (See Figure 12.)



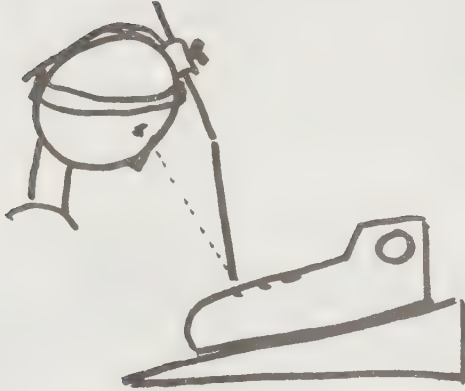
Height of Key Guard

Fig. 12 Typewriter guard

Positioning the typewriter at the right height is just as important as establishing the correct seating. As a general rule, the typewriter has to be placed as low as possible so that the arms can hang down and be extended. This position encourages the head to bend forward, which facilitates normal movements. Some children feel more secure when their forearms are supported and the typewriter tilted up. (See Figure 13.)



Fig. 13 Correct typewriter positioning



Often, if the motor skill of the hands is insufficient, a headstick is used. However, the headstick rod is frequently made too long. The eyes should be able to follow the metal rod comfortably while the head is slightly flexed. (See Figure 14.)

Fig. 14 Headstick

If a headstick proves to be ineffective, one alternative is electronic equipment. The PMV scanner system has proved to be one of the most effective systems. (See Figure 15.) The child needs only to operate one touch switch. The scanning system is varied in speed and the alphabet layout is on one line. This has an advantage over other systems in that the switch has only to be released at the desired letter without scanning in a second direction. (See Appendix 8.)

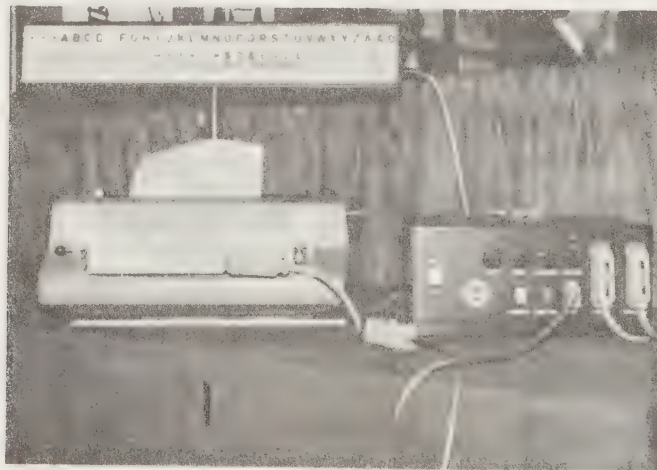


Fig. 15 PMV-Printer

C. Interfacing*

Some children are so severely handicapped that they are not able to use a pointing or coding system. Several electric and electronic devices have been developed to assist those children. Basically, there are two approaches:

1. A rotating arrow, driven by an electric motor, scans a half or full circle (see Figure 1.) The display unit can hold only a limited number of pictures or symbols. The unit usually requires two switches (interfaces) to operate the arrow, which moves forward and back. This technique is very simple -- it can be operated by a young child and it is not very costly. It is ideal for beginners who will eventually progress (for example) to a coding system using a fist.
2. A selector scanning system is more complicated (see Figure 2.) The display unit uses a matrix of 100 - 400 or more symbols, words, letters or numbers. The desired symbol is illuminated from the rear or uses a light (LEDs) beside the symbol. The child has to be able to activate an interface which moves the light in four directions (up, down, left and right). This is a very difficult task, as most of the severely handicapped children have a poor sense of direction. The child is easily able to locate the desired symbol on his display with his eyes, but has difficulties in planning and directing the scanner to the desired area. The child often watches the scanning light and, in doing so, loses the originally intended symbol. It is advantageous to first train the child to move the light only in the top row from left to right and to carefully inspect each column before moving downwards. The child's reaction time is impaired so that it may be difficult for him to stop the light in time.

* See Appendix 4 for Interface.



Fig. 1 Rotating arrow scans display.



Fig. 2 Selector scanning system,

It may be found that giving a child an electric wheelchair and using exactly the same interface for a communication board will improve the performance greatly. After the child experiences the positions and directions of right and left in operating the wheelchair, he may find it easier to apply these concepts to his board. Using the electronic communication board for games (see Appendix 6) gives the child further opportunity to learn and experience through other activities. The board can also be used in school to answer multiple choice questions. For example:

Is a dog a	-	人	○
		屋	○
What colour is a bear -	black		○
	yellow		○
	brown		○
Is a fly	-	big	○
		small	○

(A question sheet is attached to the board with holes cutout for the lights.)

Finding an appropriate interface for a child is not an easy task. It is essential that the child be sitting in a good reflex-inhibiting position. Decide which hand has better control and determine which location can be best reached without eliciting a pathological reflex. For the athetoid child this position is often found to be in the middle of his lap between his legs. A spastic child prefers to have his forearms supported on a tray and his hand in line with the side of the trunk. Having established the most accessible location for the child, it is now necessary to determine the kind of switching mechanism the child is able to operate. Can the child grasp a ball and move it in four directions e.g. as in a joystick? A joystick can be adjusted in different ways (see Appendix 4). The end of the joystick can have different sizes of knobs or can have a T-bar.

If the child cannot hold onto an object but can hit a certain area with control, a push-button or touch-switch may be useful.

Children with strong startle reactions will have great difficulties in operating any switching device that has to be touched. There are promising new experiments being conducted involving the breaking of a light beam or approaching an infrared source as a switching device in interfacing severely handicapped children. However, more research is required in this area.

Foot switches have been successful only in cases where the lower extremities are much less handicapped than the upper. There have been experiments using other parts of the body for interfacing, but these have been limited to individual cases.

Electronic equipment is a great supplement in a classroom situation and will encourage the child to work independently. The child should have a second mode of communication to be used outside the classroom.

IV APPLICATION OF THE SYSTEM

A. Introduction to Assessment and Programming

Assessment and Programming are being presented within the same section to emphasize how closely the two are related. The following steps form a continuum:

1. Determining the appropriateness of Blissymbolics and defining the objectives to be derived from the use of Blissymbolics;
2. Establishing program procedures and content, derived from the defined objectives;
3. Evaluating progress with reference to the defined objectives;
4. Readjusting the program as required.

Earlier writing about the application of Blissymbolics, and the original focus of the Formative Evaluation Study, reflected a concentration upon Blissymbols as a speech substitute for the physically handicapped and minimally mentally impaired child, age six and over. Information derived during the period of the study has revealed increasing interest and exploration in the use of Blissymbols with the severely and trainable mentally retarded population and with children as young as two years. In an attempt to project beyond the scope of the Evaluation Study, and thereby take account of these new applications, three models for the application of Blissymbolics as an augmentative means of communication will be introduced. It is recognized that these models are in the formative stage and are oversimplified; they are offered as a provisional framework to facilitate assessment and programming of symbol communication for different populations. When looking at individual symbol-users, one should consider these models only as theoretical constructs, not as rigid positions that are separate and mutually exclusive.

Model One (utilized in the initial application of Blissymbolics, OCCC, 1971) presents Blissymbolics as a communication medium which will serve the user as a functional augmentative language. It assumes that the potential symbol-user has a fairly well established native language competence even though this has been restricted to a receptive capability. The symbol-user is viewed as having reduced language experience rather than impaired language capability.

Blissymbolics is introduced as a functional expressive mode which is primary or secondary to a person's native language. The symbol-user's native language is retained for receiving information from speaking persons; however, Blissymbolics is potentially available receptively as the population of symbol-users grows and as technology makes possible the recording and transmitting of symbol messages.

With regard to program expectations, the symbol-user is expected to use Blissymbols as fluently as the speaking person uses his native language -- generating sentences as required. Each symbol's composition and meaning is demonstrated or explained to the user; a large number of symbols is expected to be utilized as the symbol-user acquires experience with the system; new symbols are "combined"; a variety of strategies are used; an infinite number of sentences and varied sentence patterns is expected.

Model Two presents Blissymbolics as a communication medium to allow the young child to interact with his environment during the early stages of language development. He is learning language and the approach to instruction is based on what is known about normal language acquisition. The child is taught in the same sequence that language is acquired by the normal child (Brown 1973). Within this model an emphasis is placed on early introduction of pictorial symbols that are easily identifiable. As with the first model, expectations include: usage of a large number of symbols; creation of new symbols; varied sentence

patterns; generation of sentences. This second model could also be applied to programs for the trainable retarded in which the instructor is following a developmentally based language-teaching program. Two examples of such programs are presented by Miller and Yoder (1972) and MacDonald and Blott (1974).

Model Three presents Blissymbolics as a medium providing communication at surface level. It is applied primarily with persons in the lower intellectual levels and assumes limited learning potential and impaired language capability. A non-developmental approach to language intervention is utilized, in which those language forms and skills are trained that are seen as being useful in order for the person to control and interact with his environment (Graham, 1975). Central to this training is a highly structured program, using imitation and reinforcement techniques. Within this model, a small number of symbols are presented for rote association of meaning. Sentence patterns are simple and stereotyped.

Assessment should lead to the selection of the appropriate model, which in turn can provide the framework for defining long and short term objectives and for planning program procedures and content.

It is important to recognize that Blissymbolics can be utilized within all three models, so that instructors will not restrict their utilization of Blissymbolics to one type of application. The versatility of Blissymbolics allows for transition to a more appropriate model if the initial program proves to be unsuitable. The model first selected should be open to modification in accordance with the on going evaluation of symbol performance.

Since the focus of the Evaluation Study was upon the application of Blissymbolics as described in Model One, most of the collected information pertaining to programming

relates to this use of the system. There is a strong need for research studies and an evaluation of programs in which Blissymbolics is utilized with the young child and with the trainable and severely retarded.

B. Assessment

1. CONSIDERATIONS IN ASSESSING COMMUNICATION NEEDS

INTRODUCTION:

In order to thoroughly assess the communication needs of a physically handicapped child, multi-disciplinary input is required. The perspective outlined in the following section is based primarily on the approach taken by representatives from Education, Speech Pathology and Psychology. While reference is made to the areas in which Therapy (including both Physical and Occupational) enters into the assessment, a complete discussion of the physical-functional considerations has been presented in Chapter III (P. 63) of this Handbook. As emphasized therein, before undertaking a communication assessment, it is expected that the child be at least adequately, and preferably optimally, seated and/or positioned, since seating generally affects the child's overall performance. While this section focuses on the assessment of the physically handicapped child, many of the factors considered are directly relevant to the assessment of communication needs regardless of etiology.

The importance of accurately assessing the child's communication needs relative to his current level of communication skills is emphasized. If a discrepancy exists between the child's communication abilities and his assessed communication needs, then one needs to consider whether an alternative or augmentative means of communication might

bridge or narrow the gap. If it is thought that the child requires an alternative to speech in order to communicate, the appropriate alternative must be selected to avoid failure on the part of the child, frustration on the part of the teacher and disappointment on the part of the parents. The emphasis is on alternatives and on matching the child's needs and abilities with the most appropriate alternative. It therefore becomes important to assess the child's needs and abilities carefully, relative to the available alternatives. Some of these augmentative modes of communication include picture boards, symbol boards, word boards, alphabet boards, signing. Symbol communication should be viewed as one of a number of possible alternative methods of communication which utilize visual materials.

The assessment is based on a task analysis approach to communication, which identifies various component factors that affect communication. The Primary factors are those which determine the recommended means of communication -- be it oral or alternative; the Secondary factors are those which influence the communication program itself. A detailed discussion of these Primary and Secondary factors follows. A consideration of these factors will assist with the decision as to which of the three Models outlined in the Introduction to Assessment and Programming (p. 89) applies to an individual child. While administering both formal and informal tests, one is able to observe the child and assess his level of functioning as it pertains to these factors. While some formal standardized assessment devices are used often in an adapted form, in order to provide a structure for the assessment, there is less concern for the scores that the tests yield and more concern about the qualitative information that is forthcoming through observations of the child as he performs in the testing situation. The assessment is conducted jointly, with the number of people

involved in the assessment at any one time varying, depending on the child's age and level of distractibility. The particular combination of disciplines involved may also vary. Regardless of the number and combination of participants, joint assessments are useful, as they allow one person to be directly involved with the child, leaving the other(s) free to observe the child's behaviour in the areas identified through the Primary and Secondary factors. Testing instruments which have been used for communication assessments will be identified in the following section; however, this section is intended to present areas for consideration as part of a communication assessment, rather than the techniques employed for looking at these areas.

Some of the factors which will be presented are relevant in looking at the child's skill in communication (COMSKILL); others are related to the child's potential skill with the symbol system (SYMSKILL). (For definition of COMSKILL and SYMSKILL see the Programming section, pp. 191-199.) Where possible, a distinction will be made as to which affect COMSKILL and which affect SYMSKILL.

Through the data analysis, some of the variables have been found to be statistically significant predictors of the inexperienced symbol-user's SYMSKILL on a short-term basis (see Data Analysis, p. 32) and/or on a long-term basis (see Data Analysis, p. 34). In the following discussion of the factors, items which are accompanied by a single asterisk (*) are short-term predictors of SYMSKILL; whereas, items accompanied by a double asterisk (**) are predictor variables which indicate how the child is functioning after one year's experience with symbols. Because of their predictive value, it is particularly important, as part of the initial assessment, to record the child's level of functioning in areas which have been asterisked. There is a consistent relationship between the predictor variables and

SYMSKILL; for example, if a subject gets a high score on the variable, then he has a better chance of getting a high score on SYMSKILL, and a low variable score corresponds with a low SYMSKILL score.

Following discussion of each factor a related question has been formulated as a means of recording the child's level of functioning in that area. These items are based primarily on the Progress Report recording materials developed as part of the Symbol Evaluation Study. Based on input from the instructors using the materials as well as further clinical experience, some additional items have been developed and some original items revised. New and amended items are denoted by (R). These will be incorporated into an initial assessment recording form which will be available from the Blissymbolics Communication Foundation following publication of the Handbook.

PRIMARY FACTORS WHICH DETERMINE RECOMMENDED MEANS OF COMMUNICATION:

Desire to Communicate:

The first factor that must be considered is whether or not the child indicates a desire to communicate. Does the child understand the value of communication? If so, how is this manifested? Is he able to choose among alternatives? Does he have a "yes/no" response? The desire to communicate can be manifested verbally or non-verbally. It is a factor related to COMSKILL.

Children are generally motivated to effect changes in their environment. If a child does not exhibit this "effectance motivation" (White, 1959) through communication, it is important to develop this concept. Effectance motivation seems to develop early in life when the infant becomes aware that certain actions have consequences while others are without effect. Those effects which occur as a

consequence of the infants' actions (i.e. contingently) will tend to be repeated if the effect is desirable (Friedman & Vietze, 1972).

Teaching the child that he can manipulate his environment by communicating can be accomplished by introducing the use of adjunctive aids in media to which he is already able to relate, e.g. objects, pictures, Blissymbols; while at the same time responding to any intelligible approximations he makes to speech. He can learn to make choices in his activities of daily living and in his play. For example, if the child is able to relate to objects, three different toys could be presented for him to select one for play. The child then receives the consequences of his action; that is, whatever toy he has chosen. This kind of process can be extended to all the child's activities of daily living where it is practical to give him a choice. Which dessert would he like? He consistently receives the consequences of his selection. The child begins to learn that what he "says" can produce an effect. Some children who perhaps have always had their needs anticipated may not have had the positive experience of communicating a wish and eliciting the desired reaction. For some children, learning this concept may take a long time. Because of the novelty of the situation, some may play with their choices and not take choosing seriously. For example, a child may point to an apple as his choice for dessert, when he really wanted the ice cream which was also offered. When given the apple he may fuss or show a temper. In this situation, if he is to learn that his choices have meaning and effect consequences, the apple should remain as his selected dessert. If the ice cream were substituted, then it becomes difficult for the child to learn that his choices do make a difference or that what he says matters. The next time the child has a choice between ice cream and an apple for dessert, if the child has learned from the last experience, one would expect him to select the ice cream with no hesitation, if that is still his preference.

Learning that his communication has meaning should be separate from, and prior to, learning any new system, not dependent on a knowledge of that system. The child needs to experience easy and successful communication, which could not occur if considerable time had to be spent teaching a system before it could be used in communication. This is the rationale for beginning to teach the process of communication, through objects or pictures, to the child who shows no desire to communicate through Blissymbolics. The child should not have to wait until he has learned symbols before learning to communicate. If he understands pictures, they should become the initial medium for teaching him how to communicate.

However, if a child shows that he easily relates to Blissymbolics through his initial exposure to them, communication may be motivated through the introduction of a limited number of symbols which are quickly learned, which are meaningful to the child, and which are representative of his needs so that he can immediately use them in communication. For example, the child may quickly learn the symbols *happy* and *sad*. In encouraging the child to communicate his feelings, these symbols could then be presented along with pictures and objects, thereby expanding his communication repertoire. In general, for a child who shows no interest in communication, there is an urgency to teach him that he can communicate and have his message understood. This implies using what the child already knows or what he can easily learn.

For a young child, undue emphasis should not be placed on a consistent "yes/no" response as an indicator of desire to communicate. While it is important to be working toward establishing a clear "yes/no" response, it is not the sole indicator that a child wants to communicate. Some consider it to be a prerequisite to symbol instruction. While the child's concept of "yes/no" may be unclear, he may give evidence that he is able to make more choices at a more

basic level. For example, if a child will select one toy to play with from three given alternatives, he is indicating an awareness that he can effect consequences, at an elementary level.

The degree of interest the child demonstrates in communication, as well as the manner by which he shows this level of interest, may be recorded in the following manner:

- (a) Degree of interest the child demonstrates in communication

(a) no interest	
(b) little interest	
(c) some interest	
(d) a great deal of interest	

- (b) The manner by which the child demonstrates interest in communication

(a) no interest	
(b) indicates a preference between two alternatives	
(c) indicates a preference among more than two alternatives	
(d) responds to questions with a consistent "yes" or "no"	
(e) responds to questions with other than "yes" or "no"	
(f) initiates interaction to communicate desires	

Another indication of the child's desire to communicate is what he does when his message is not understood the first time he attempts to communicate it. This may be recorded as follows:

The child's response when the meaning of his message is not being comprehended by the listener is

*

**

No attempt to deal with situation	
Repeats first message	
Environmental clues accompany first message	

(R)

This factor is predictive of the child's skill with symbols both in the short and long-term. One can hypothesize that the child's attempts to use alternative ways of expressing his message reflect not only a strong desire to communicate, but also a resourcefulness which would allow him to make use of the more creative and more advanced levels of the symbol system, all of which would yield a higher SYMSKILL score.

Present Means of Communication:

What is the child's actual present means of communication? His present means of communication is a major component of COMSKILL. Is the child communicating by limited speech vocalizations, gestures, facial expressions, behaviours or some type of communication device e.g., picture or word-board? Is the child already making use of alternative means of communication or is all his communication channelled through attempts at speaking?

It is important to assess the child's desire to communicate through an alternative means. If an alternative is recommended, and the child hitherto has always tried to communicate orally, he may need to learn the value of an

alternative means of communication in order for it to become acceptable to him. Just as the child who showed no interest in communication needed to experience success at manipulating his environment through communication of any sort, this child needs satisfying experiences where frustration is reduced by expressing himself non-verbally through alternative means. The same principles outlined in Desire to Communicate would apply in deciding which means to use in order to teach the concept of the value of an alternative means of communication.

The means of communication used by the child may be ranked 1-3, and any additional means the child uses checked on the following chart:

(a)	(a) gestures	
	(b) facial expressions	
	(c) signing	
	(d) vocalizations	
	(e) speech	
	(f) behaviour	
	(g) verbal yes/no responses	
	(h) non-verbal yes/no responses	
	(i) picture board	
	(j) symbol board	
	(k) alphabet	
	(l) word board	
	(m) alphabet or spelling board	
	(n) typewriter	
	(o) other	

The importance of accurately assessing the child's communication needs relative to his current level of communication skills is emphasized. Is the composite of the child's present means of communication commensurate with his communication needs? Does the child have a way of communicating all he needs to say, or are there situations

when the child has great difficulty communicating feelings, thoughts or ideas due to a limited means of communication?

When the child uses the above means of communication, how well he is able to express all that he wants may be rated as follows:

- (b)
- 1 - not at all
 - 2 - somewhat
 - 3 - mostly
 - 4 - always

R

Language Comprehension:

Language comprehension directly affects COMSKILL. Information from formal language tests is used as an indicator of the child's language comprehension level. While the assessment of language comprehension level using formal standardized instruments is valuable; ascertaining the child's level of language comprehension through clinical observation is also important. The clinical impressions are based on observing the child in the classroom, with parents, as well as in the assessment session. In the informal assessment, it is important to differentiate how much the child understands with accompanying context, from how much he understands without relevant context. How much is the child understanding through reliance on the speaker's gestures and other visual cues? How much can he understand when the communication is purely verbal? An attempt is made to account for any discrepancy between the assessed language comprehension level and the observed language comprehension level.

If a child does begin a symbol program, his language

comprehension will affect the level at which the meaning of the symbols can be explained.

The assessed and observed language comprehension levels of the child may be recorded as follows:

Language Comprehension Levels

	Assessed (1)	Observed (2)
(a) grossly below age level		
(b) 2 years, 1 month - 3 years below age level		
(c) 1-2 years below age level		
(d) 1-11 months below age level		
(e) at age level		
(f) 1-11 months above age level		
(g) 1-2 years above age level		

Name of test(s) used in assessment:

Level of Functional Speech:

The expressive aspect of speech must also be considered, and the child's highest level of verbal communication determined. Expressive speech is also related to COMSKILL. Does the child communicate with vocalizations, with some attempts at verbalizing single words? Is his highest level of verbal communication different when imitating speech, when he spontaneously makes statements or when he asks questions? What is the extent of his expressive

vocabulary? What is the complexity of his grammatical constructions? This information may be recorded in the following manner:

Highest level of verbal communication demonstrated by the child in imitation, in spontaneous statements and in spontaneous questions

	Imitation	Statement	Question
(a) no sound used for communication			
(b) vocalizations			
(c) yes/no response			
(d) intelligible single words			
(e) intelligible 2-word phrases			
(f) more than 2-word phrases			

RECORD

Extent of Vocabulary	Complexity of Grammatical Structures

Name of test(s) used in assessment:

How functional is the child's speech? Are the parents and familiar persons the only people who understand the child's speech? To what extent is an alternate mode of communication necessary as a supplement or complement to speech? This may be determined from general observations during the assessment and from reports from the family and the school.

Potential for Speech

(a) Oral Peripheral:

The oral musculature must be examined to detect any irregularities in tongue movements, soft palate, and lips. Diadochokinetic rates should be established whenever possible. Oral examination should also look at breath support, voice production, and jaw extensor.

(b) Feeding:

An assessment of the child's feeding abilities should take into account drooling; the range, speed, strength and precision of tongue and/or lip movement; as well as atypical and/or delayed oral reflexes affecting feeding patterns (Rom, 1976). Feeding problems should be queried with the parents as well. Such information may be recorded thus:

Severity of drooling

(a) none	
(b) mild	
(c) moderate	
(d) severe	

RECORD:

range of movement	
speed of movement	
strength of movement	
precision of movement	
oral reflexes	

R

A distinction is then made between the degree of feeding difficulties related to oral musculature and those related to hand control.

Degree of feeding difficulties

	Oral	Hand
(a) none		
(b) mild		
(c) moderate		
(d) severe		

R

(c) Prognosis for Speech Development:-

In determining the prognosis, the results of the oral peripheral examination are considered along with any changes in the level of functional speech over the past two years. For example:

(i) Change in level of functional speech

(a) deteriorated over past 2 years	
(b) improved over past 2 years	
(c) remained same for past 2 years	

(ii) If a change occurred, when it happened

(a) past 6 months	
(b) past year	
(c) past 2 years	

(iii) Opinion of

(a) teacher	
(b) speech pathologist	
(c) doctor	
(d) psychologist	
(e) parent	
(f) other	

A summary can then be made of the child's speech development, including speech milestones in comparison with other developmental milestones.

A summary may also be made of the child's past history in Speech Therapy, including duration and frequency of therapy, goals and accomplishments, to the present time. For example:

HISTORY OF SPEECH THERAPY

Date Began	Date discontinued	Frequency of Sessions	Goals	Accomplishments

In addition, information regarding the prognosis for the development of functional speech should be considered for both short and long-term development. The following chart may be useful:

Speech pathologist's prognosis for development of functional speech

	Short-term	Long-term
(a) unknown		
(b) poor		
(c) limited		
(d) good		

R

In cases in which the short-term prognosis is poor, and the predictions for the long-term development are uncertain, an alternative form of communication may be recommended on a short-term basis. An augmentative means of communication may serve as the primary means of communication or as a secondary means complementing speech. The purpose of the recommended alternative may vary for short and long-term intentions.

If an augmentative means of communication is being considered, the intended relationship to speech may be recorded as follows:

	Short-term	Long-term
(a) as a primary means		
(b) as a secondary means		
(c) not at all		

R

When a child is using symbols as a secondary means of communication, adjunctive to another means of communication--whether speech, gesture, behaviour --there is less of a need for him to develop sophisticated use of the symbol system. (See Research Data Section, Evaluation Study, p. 98.) As with the mobile child, he has other ways of communicating and, as a result, does not have to make the system work for him all of the time.

He is likely to use the system for specific vocabulary needs, but is not required to explore the many strategies which allow for the expansion of the system.

This child uses symbols less often than the child using symbols as his primary means of communication, which also gives him less opportunity to develop skill with the system.

Highest Visual Level:

Using the following hierarchy, an assessment should be conducted to determine the highest level of visual materials to which the child can react appropriately:

- (a) concrete three-dimensional objects;
- (b) representations of three-dimensional objects: for example, miniatures;
- (c) coloured pictures (two-dimensional);
- (d) black and white pictures;
- (e) simplified drawings;
- (f) meaningful symbols: Blissymbols;
- (g) arbitrary symbols: letters of the alphabet.

The level of visual materials to which the child reacts appropriately will determine the content of the communication alternative to be recommended - objects, pictures, symbols, words. For example, if the child can deal only with three-dimensional concrete objects, his communication system should utilize such materials. When this child is asked to communicate a preferred activity; for example, playing with a ball, reading a book or colouring, the actual objects-- ball, book and crayons-- should be presented to him for his selection. For the child who understands the meaning of pictures, presenting pictures of ball, book and crayons would be appropriate. In considering a word board as the alternative means of communication, the child's ability to communicate should not be dependent on acquiring reading skills, but rather it should be dependent on reading skills already acquired. Highest visual level will affect SYMSKILL.

If the child can react to pictures, some Blissymbols may be introduced as part of the assessment procedure in order to ascertain whether the child can use symbols. The speed with which the child learns the symbols presented may be recorded as follows:

* The way in which the child learns symbols

(a) very slow learner, continuous drill	
(b) slow learner, some drill	
(c) average learner	
(d) learns quickly	

This has been found to be a statistically significant predictor of SYMSKILL.

An attempt should be made to ascertain whether the child can make use of the symbols learned in response to questions. The child's ability to retain the symbols is also noted. Additional information may be obtained about the child's potential with symbols by observing his interest in creating new symbols and recording these observations on the chart presented below.

* Level of interest the child shows in creating new symbols

(a) no interest in creating new symbols	
(b) contributes to creating symbols, but highly dependent	
(c) attempts to create new symbols but needs assistance to complete	

R

Interest in creating new symbols is a statistically significant predictor of SYMSKILL.

It is important not only to establish the highest level of visual materials with which a child can interact, but also to establish the manner in which he interacts with such materials. Is the child able to respond receptively to the name of an object? Can he comprehend, on a more abstract level, its functional use as well? Can he appropriately respond to "show me what you drink from" as well as to "show me the cup"? Within the hierarchy presented, is he able to cope with visual materials at one level by name and by function but at a higher level only by name? Is he able to relate only by name at all levels?

Assessing the child's level within the context of the chart below provides an indication of the expectations one can have for the child's communication program. If the child responds only by name to all stimuli at the lower levels of the hierarchy (a-e), one can expect that his way of using symbols (f) might be the same. This child will likely be unable to make use of the potential of symbols that their abstract qualities allow. If, however, the child gives evidence of understanding functional use at some lower levels of the hierarchy, then the expectation might be that he could learn to deal with higher levels in a more abstract way as well. How the child functions in this area of highest visual level is one of the factors which should influence the instructor's choice of a Model of symbol application.

The manner by which the child relates to various levels of visual materials is:

	By Name	By Function
(a) actual concrete objects		
(b) scaled representations of actual objects		
(c) coloured pictures		
(d) black and white pictures		
(e) simplified drawings		
(f) meaningful symbols		
(g) arbitrary symbols		

SECONDARY FACTORS THAT INFLUENCE THE NATURE OF THE PROGRAM :

These factors are generally considered important components of any instructional program. For the most part these factors affect both COMSKILL and SYMSKILL.

Family History:

Family history includes descriptive information about the child's residential setting, the family constellation, as well as subjective information about the family's attitudes, specifically about the child's communication needs, and more generally, about the child as a handicapped individual. Such information may be recorded in the following manner:

(a) Residential setting	
(b) Family constellation	
(c) Family's attitudes re communication	
(d) Handicap	
(e) Other comments	

Ⓡ

It is important to determine the frustration level of family members with whom the child communicates. Their level of frustration may greatly affect their readiness to receive a recommendation for an alternative means of communication, as well as their motivation to use it.

The following chart may be completed for each family member. Differences in level of frustration experienced by each member should be noted and considered in dealing with the child's overall program in determining key family members with whom to work.

In column 1 (using Key 1) the degree of frustration each family member experiences in communicating with this child can be indicated

In column 2 (using Key 2) the frequency of frustration each family member experiences in communicating with this child can be recorded

KEY 1
(a) very mild
(b) mild
(c) moderate
(d) extreme

KEY 2
(a) rarely
(b) sometimes
(c) often
(d) very frequent

FAMILY MEMBER	COLUMN 1	COLUMN 2

(R)

Before beginning a program of communication it is important to ascertain the attitudes of the family, including the potential symbol-user, towards introducing an alternative means of communication.

An important factor to consider when implementing a symbol communication program, particularly for an older child, is the potential user's own attitude toward the recommended alternative. For an older child whose reading and/or spelling abilities are adequate to use a word and/or alphabet board, one must consider the user's own preference. The child's attitude toward learning new symbols is a statistically significant predictor of SYMSKILL.

Child's attitude toward learning new symbols may be rated in the following way:

** 0 1 2 3 4 5 6

KEY

0	Actively rejects learning new symbols
1	No interest in learning new symbols
2	Can be directed toward learning new symbols
3	Shows interest in learning new symbols presented
4	Asks meaning of unknown symbols on display
5	Initiates request for learning new symbols
6	Initiates and independently directs search for new symbols, e.g. in Semantography

Since the family's feelings directly influence the child's attitudes, a necessary part of the child's program is the education of the entire family. Sometimes parents of young children are discouraged by the notion of a substitute for speech and are not ready to accept that the prognosis for speech is limited. It is important to deal with these feelings and to explain the positive aspects of symbols for speech and general language development. Parents of older children who have worked out a limited, but functional, system of communication on their own may not understand the need for a broader means of communication which can be more readily understood by more people. They may be threatened by this new approach; they may also underestimate the communication needs and overall abilities of their child.

Some parents may require assistance in learning how to relate to their child in a new way. Parents must be prepared in order to deal with the consequences of their child's expanded communication system. They must become prepared to deal with the questions, thoughts and feelings their child may now have the opportunity to express. Those working with the child need to inform the parents of the type of questions the child may now have the chance to ask. Probing questions regarding his disability, his future, his social life may catch the parent off-guard, as they may not have accurately estimated the depth of their child's thinking or concerns. Parents should also be informed as to the medical and non-medical resources available to them for seeking answers to these questions - either with their child or independently. The parents should be supported with information which will enable them to deal with these aspects of their child's development honestly and confidently. In some instances, the child may reveal problems which are beyond the parents' ability to cope with them. The parents should be aware of special resources, such as social workers or psychiatrists, that might be available to assist with these problems.

While it is undoubtedly important to educate, support and counsel the family to understand the value of an alternative means of communication, it is also essential to evaluate the success of such attempts. After one school year of working with parents who have not shown positive feelings about symbols, one must objectively review the situation. Non-positive attitudes may be manifested either as indifference or as negativism. A child whose family has not been supportive but which has shown indifference or apathy may not progress to the same extent as he could have with support. While these attitudes may impede his progress, he will not experience the same kind of conflict as the child whose family's attitudes persist in being overtly negative. In the latter instances, one must seriously consider the overall effects on the child if the program is continued.

The considerations outlined above with regard to the family apply equally to ward staff in institutional settings.

Social Development:

Communication implies social interaction. Therefore one must consider the child's level of social development in assessing communication needs and program goals. It is particularly important with young children to assess play level. The following chart may be useful in this area:

Level which best describes the child's play

(a) unoccupied behaviour	
(b) onlooker behaviour	
(c) solitary independent play	
(d) parallel play	
(e) associative play	
(f) co-operative play	

Ⓡ

One needs also to consider the quality of the child's communication with others -- typically, with whom does he communicate and in what way? Such information may be recorded on the following chart:

People		How child Interacts
	familiar adults	
	unfamiliar adults	
	speaking peers	
	non-speaking peers	
	younger children	

KEY (a) attention-seeking behaviour
 (b) responding to interaction
 (c) initiating interaction

While the majority of children show no significant preferential differences, notice should be made if a child, in interacting with either adults or other children, shows a preference for relating to members of a particular sex (Yoder, 1976). If, for example, a girl withdraws from men, the quality of her communication with a man would differ significantly from her communication with a woman. This would have implications for both the assessment situation (particularly if the assessor was a man) as well as for programming. Such information may be recorded in the following manner:

Preferences child indicates in interacting

	M	F	No apparent preference
adult			
child			

(R)

Present Behaviour and Personality:

It is important to note the child's current ways of expressing his individuality. It may be necessary to identify and to alter some of his behaviour patterns, re-channeling the child's present ways of relating into more constructive means of communication. For example, if the child's established way of indicating that he wanted a drink was to cry, he needs to learn that crying is no longer acceptable and that pointing to the symbol *drink* is the appropriate substitute behaviour. However, it may be threatening to the child to abandon his well-established patterns of relating and communicating in favour of new means. The child's self-concept may be tightly bound up in those behaviours. It is therefore important in implementing the child's program to retain a place for acceptable behaviours which make up the child's present means of communicating, while simultaneously developing new approaches. For example, for a child who has learned to associate a particular vocalization consistently with wanting to watch television, it would be desirable to continue encouraging him to vocalize at the same time as teaching him to point to the symbol *television*. Unlike the crying behaviour associated with the drink in the earlier example, the vocalization is not unacceptable behaviour and, therefore, is not discouraged but rather encouraged along with symbol learning.

(a)

(a) Behaviours used to communicate
(b) Current emotional state
(c) Other comments

(R)

One should identify the child's current emotional state in order to ascertain whether it would interfere with or support a learning program. Is he depressed? If so, this

could account for lack of progress or lack of interest in a learning program (see Research Data, Evaluation Study, p. 71). Is he well motivated? Is he frustrated? Related to desire to communicate is frustration level. A child whose desire to communicate is great usually shows great frustration. A child who indicates little frustration may not see the value of communication, or may have become apathetic and no longer have the desire to communicate. How does the child manifest frustration? To what degree and with what frequency does the behaviour occur? The following charts are suggested ways in which this information may be recorded:

(b) CHILD'S FRUSTRATION: degree and frequency

(a) CHECK (in column 1) no apparent frustration or the manner in which frustration is manifested.

(b) RATE (in column 2) the degree of the behaviour manifested using the following key:

- (a) very mild
- (b) mild
- (c) moderate
- (d) extreme

(c) RATE (in column 3) the frequency of this behaviour using the following key:

- (a) rarely
- (b) sometimes
- (c) often
- (d) very frequent

	1	2	3
(a) no apparent display of frustration			
(b) aggression			
(c) apathy			
(d) other			

Educational History :

It is important to know the academic history of the child as well as his present educational program. This is another indication of what past expectations have been for him in terms of academic achievements. How long has the child been in school? What kinds of educational program has he been in -- an academic one or one oriented to the retarded? The following recording procedure may be used:

School placements up to present time
Use KEY for Type of Program

TYPE OF PROGRAM KEY

(a) academic
(b) opportunity class for educable retarded
(c) retarded setting for trainable retarded
(d) private tutoring or home instruction
(e) no schooling
(f) other, specify

DATE	SCHOOL AND ADDRESS	TYPE OF PROGRAMME	LEVEL

One must ascertain the resources available in the child's present school in order to establish who will have the direct responsibility of managing the child's program. In some instances it might be the classroom teacher, in others the speech pathologist, in still others the occupational therapist. While it is desirable for many people to support a program, one particular person must be designated as having the responsibility for managing the program. One should also be aware of the general attitudes in the school toward various alternative means of communication, and whether there already exists a bias toward a particular kind of alternative system e.g. signing or word boards.

The teacher's level of frustration in communicating with the child plays an important role, as it does with the family, in affecting motivation to implement a program incorporating an alternative means of communication. This may be recorded by circling:

In Key 1 the degree of frustration the teacher experiences in communicating with the child

In Key 2 the frequency of frustration the teacher experiences in communicating with the child

KEY 1
(a) very mild
(b) mild
(c) moderate
(d) extreme

KEY 2
(a) rarely
(b) sometimes
(c) often
(d) very frequent

Present Educational Achievement

Within the perspective of the length and nature of the child's educational career, one should consider his level of functioning. What are his math skills? What is his level of functioning in the language arts area? What are his pre-reading or reading skills? The child's reading level is a long-term predictor of SYMSKILL. The following charts might prove helpful in reading such information:

(a)	(a) Math skills	(R)
	(b) Language Arts	
	(c) Other areas	

Level of Intellectual Functioning:

When the child lacks an expressive means of communication, it is only possible to obtain a gross indication of his level of intellectual functioning. The mental age of the child gives some indication of his rate of learning, that is, whether he is retarded or not retarded. Records of previous assessment results also indicate past expectations for learning on the part of the child. Once the child has a more extensive means of communication, it becomes possible to do more refined and detailed formal assessments which yield profiles of strengths and weaknesses. (See Social-Psychological Implications Section, p. 220).

(a) Previously assessed level of intellectual functioning

(a) severely retarded	
(b) moderately retarded (trainable)	
(c) mildly retarded (educable)	
(d) borderline retarded	
(e) low average (dull-normal)	
(f) average	
(g) high average (bright-normal)	
(h) superior	
(i) very superior	
Name of test(s) used in assessment, if known _____	

(b) Category of present level of intellectual functioning according to formal assessment

*

☐

(a) retarded

☐

(b) non-retarded



Assessed I.Q. utilizing the broad categories of "retarded" and "non-retarded" has been found statistically significant as a short-term predictor of SYMSKILL.

Along with the assessed level of intellectual functioning, the apparent level of intellectual functioning, based on the clinical observations of the child's instructor, provides useful information.

A subjective way of assessing the child's intelligence is to observe how he reacts to his environment. Does he respond to humour in situations? What type of humour interests the child - direct or subtle, slapstick, incongruities? Is he interested in or involved in the surrounding activities? Does he attend or participate in some way? Does he show curiosity? Does the child's span of interest vary with preferred and non-preferred activities? The following scales may prove helpful in recording such data:

- (c) General level of alertness (as often demonstrated by sense of humour)

(a) no interest in surroundings	
(b) little interest in surroundings	
(c) sometimes observant; sometimes sees humour in situations	
(d) very alert, observant, sees humour in situations	

- (d) Apparent level of intellectual functioning, based on clinical observations

(a) severely retarded	
(b) moderately retarded (trainable)	
(c) mildly retarded (educable)	
(d) borderline retarded	
(e) low average (dull-normal)	
(f) average	
(g) high average (bright-normal)	
(h) superior	
(i) very superior	

Note the occurrence and direction of any discrepancy between the assessed and observed level of intellectual functioning.

Vision:(a) Visual Acuity

The child's visual acuity can be investigated only in a gross way by the assessment team. Note is made of the child's ability to focus on and to attend to visual stimuli. Attention is also paid to his field of vision, the size of stimuli he can see, the space required between individual stimuli in order for him to see them. These factors determine the number, size and placement of picture symbols or words on a display. Any questions regarding the child's visual abilities should be referred to an ophthalmologist, with specific reference to the child's potential use of the alternative means of communication under consideration.

CHECK if the child has a visual problem which might impede learning a visual system

Yes ☐ No ☐ Specify _____

The child's visual performance may be recorded as follows:
Child's ability to attend to visual stimuli

(a) poor	
(b) fair	
(c) good	
(d) excellent	

Smallest size picture to which child can relate

(a) 3" square	
(b) 2" square	
(c) 1" square	
(d) ½" square	

Smallest distance between stimuli which child requires in order to see them

(a) 3"	
(b) 2"	
(c) 1"	
(d) ½"	
(e) no space	

(b) Visual Perception

(i) Form Discrimination. Form discrimination refers to how many shapes the child can discriminate among, and how fine those discriminations can become. Is the child, for example, able to make gross distinctions between a circle and a square, but unable to distinguish between a circle and an oval? This becomes a guide to the selection and number of pictures, symbols or words that would be introduced at one time.

The largest number of shapes from which a child can select a particular shape upon request

(a) 0	
(b) 1-2	
(c) 3-5	
(d) 6-8	
(e) 9 or more	

The basis on which child can make visual discriminations

a) gross differences ☐

b) fine differences ☐ (R)

(ii) Figure Ground Perception. Figure ground perception refers to the maximum number of visual stimuli presented simultaneously in one visual frame from which a child can select one stimulus; it is the ability to perceive a form and to sustain that perception in the face of other stimuli. This will influence the number of pictures, symbols or words which appear on the display at any one time.

For a child at the pre-symbol stage:

Complexity level of a picture from which child can select one item upon request

(a) 1-2 items
(b) 3-5 items
(c) 6-10 items
(d) 11-30 items
(e) 31 or more items

For a child ready for symbols:

- * The largest group of symbols from which child can
 ** select one symbol upon request

(a) 1-5	
(b) 6-15	
(c) 16-30	
(d) 31-50	
(e) 51-99	
(f) 100 display	
(g) 200 display, partly covered	
(h) 200 display	
(i) 400 display, partly covered	
(j) 400 display	

(iii) Colour Concept. Since it is often considered advantageous to make use of colour coding to provide location and category cues on symbol displays one should be aware of the child's understanding of colours. Even if the child cannot name colours, but can make colour discriminations, it may be useful to introduce colour coding of symbols as an additional cue for the child, from the outset of the program. On the other hand, if the child has no concept of colour differences, the addition of colouring may confuse or distract him. It becomes important, then, to determine the child's ability to deal with colour.

The level best describing the way child
 relates to colours

(a) no concept of colour differences	
(b) has concept of colour differences	
(c) can match colours	
(d) can discriminate most colours	
(e) can name most colours	

Auditory Area:(a) Auditory Acuity

Whenever possible, a pure tone hearing threshold test is administered. However, because of their severe physical involvement many of the children require special tests which are not readily available. In such cases, it is necessary to rely on earlier reports and gross measures taken with noise makers and the spoken word, as an interim measure, until further refined testing can be done. The teacher may find the following recording approach helpful:

Hearing assessment:

CHECK ☐ a) formal evaluation

☐ b) informal gross assessment (R)

Diagnosis

(a) no hearing assessment	
(b) no hearing loss	
(c) mild hearing loss	
(d) moderate hearing loss	
(e) severe hearing loss	

Requires hearing aid

(a) Yes	
(b) No	
(c) Has aid but does not wear	
(d) No longer requires aid	

(b) Auditory Attention

One observes the child's auditory attention through his general reaction to auditory stimulation.

Child's ability to attend to auditory stimuli

(a) Poor	
(b) Fair	
(c) Good	
(d) Excellent	

It is necessary to consider which modality -- visual or auditory, (or other) would be the best to use in the teaching program in order to present material to the child in a way that takes full advantage of his areas of strength.

The child's ability to learn through the various modalities may be rated as follows:

**

(a)	visual channel	
(b)	auditory channel	
(c)	other, specify	

KEY
(a) poor
(b) fair
(c) good
(d) excellent

In looking at the child's strongest modality for learning, the memory component is important to consider as well. For example, how well can the child recall objects that are hidden? How well can the child retain the verbal explanation of a symbol?

The child's visual and auditory memories may be rated using the following key:

(a)	visual memory	
(b)	auditory memory	

KEY
(a) poor
(b) fair
(c) good
(d) excellent

Ⓡ

Mobility:

The mobility of the child plays an important part in deciding the type of display to be provided for the child. The mobile child has special needs which must be met with an easily accessible display. For the child seated in a wheelchair, a display surface is provided by attaching a tray to his wheelchair, but for the mobile child other devices must be developed, in order to provide an easily portable, light-weight and durable display.

The vocabulary selection would be affected as well in order to meet the relevant needs of a mobile child. The initial symbols introduced would likely differ greatly from those selected for a child in a wheelchair. For the mobile child, the initial selection would likely not include basic needs such as food, drink, toilet but might include emotions and questions which would immediately expand his existing communication repertoire.

For the mobile child one should consider other existing means of communication, such as signing. Several factors are emerging as important considerations in making such a decision:

- (a) The child's ability in motor planning;
- (b) The child's ability in motor control -- fine and gross;
- (c) The child's predisposition to using a gesture system;
- (d) The child's home community;
- (e) The child's school having a particular orientation toward one alternative or another.

Hand Function:

While the extensive assessment of hand skills is done by the occupational and/or physical therapist, the teacher, speech pathologist or psychologist is capable of assessing whether the child will be capable of fine pointing with one finger or gross pointing with a fist. If hand skills are very limited, the part of the body which could be functional to access a symbol display should be determined. The therapist should investigate further any possible areas of strength. The child's means of access to symbols could affect the format of the symbol display as well. Hand skills may be assessed in the following manner:

Ability to point with his hand

(a) point finely	
(b) point grossly	
(c) not at all	

(R)

Part(s) of the body over which the child can best exercise control

(a) finger	
(b) hand	
(c) foot	
(d) knee	
(e) eyes	
(f) head	
(g) other	

(R)

Electronic equipment requirements

(a) not required	
(b) has electric equipment	
(c) requires but unavailable	
(d) requires improved electronic equipment	
(e) other	

Until a child has an adequate means of access to his display, his symbol performance is restricted. The child may experience heightened frustration, knowing of the potential the system can offer, while also knowing his difficulties in being able to use it. (See Research Data, Evaluation Study, p. 66).

Once consideration has been given to all these factors, then a multi-disciplinary decision is made as to the most appropriate means of communication to be taught, as well as the Model of application which is most suitable in programming.

Data on the research population regarding assessment-related items which were part of the Progress Report can be found in the frequency tables in Appendix 3, of the Evaluation Study. The Research Data section (Evaluation Study, p. 66) also presents information on the population with reference to the relationship between SYMSKILL and assessment-related variables. Also presented is an analysis and discussion regarding symbol users who demonstrated limited achievement in SYMSKILL.

FORMAL ASSESSMENT DEVICES

2. FORMAL ASSESSMENT DEVICES

To date there is no formal test battery which is organized in such a way as to provide a systematic assessment of the areas just outlined. The assessor is required to have a collection of tests which provide materials enabling him to look at the child in the light of the factors discussed. The following list contains formal assessment devices that have been recommended by instructors as being useful tools in a communication assessment. The name of the test is given, along with the publisher, test format, age appropriateness and purpose. In many cases the tests can be adapted in order to yield information relevant to the communication assessment. For example, the Peabody Picture Vocabulary Test is intended to measure a child's receptive vocabulary; however, it also gives information useful in assessing the child's Highest Visual Level as it reveals how the child relates to two-dimensional black and white pictures. Similarly the Reynell Developmental Language Scales, while providing the child's Language Comprehension Level, also indicate whether the child can identify objects by name or by function. A future area of study would be a systematic analysis of each of the instruments, evaluating their relevance in assessing each of the factors considered to be part of a communication assessment.

ASSESSMENT OF CHILDREN'S LANGUAGE COMPREHENSION (ACLC) :

R. Foster, J. Giddan and Joel Stark; Consulting Psychologists Press, 599 College Avenue, Palo Alto, California 94306; 1972.

Test format: A series of plates and questions requiring that the child respond by pointing.

Age: 2 - 6 years

Purpose: Attempts to determine the level at which the child is unable to process and remember lexical items in syntactic sequences. Test runs progressively more difficult from identifying common nouns to making complete sentences. Aids clinicians in assessing particular limitations in language development.

ASSESSMENT IN INFANCY:

Ina C. Uzgiris and J. McV. Hunt, University of Illinois Press, Chicago; 1975.

Test format Consists of six ordinal scales of psychological development in infancy. The tester presents various materials in 'eliciting situations' and observes and records critical actions for each of the six scales.

Age: 0 - 2 years

Purpose: To assess levels of competence commonly shown during the first two years of life.

AYRES SPACE TEST:

A. Ayres, Western Psychological Services, Box 775, Beverly Hills, California; 1962.

Test format: A task requiring the child to visually decide which shape fits in which hole.

Age: 3 years and over

Purpose: To measure space relations: speed, position, or directionality, and space visualization. The task can be easily grasped without verbal explanation and is therefore adaptable for deaf, aphasic, etc. Task may be completed by gesture for cerebral palsied.

BOEHM TEST OF BASIC CONCEPTS:

Ann E. Boehm, Psychological Corporation, 304 East 45th St., New York, N.Y. 10017; 1969.

Test format: 50 pictorial items arranged in increasing difficulty. Each item consists of a set of pictures and questions which the child responds to by marking a sheet. (15-20 minutes)

Age: Pre-school

Purpose: To measure the mastery of concepts considered necessary for achievement in the first years of school; for example, directions. Strong linking of concept and language development at pre-school and primary levels.

CALLIER-AZUSA SCALE:

Robert Stillman, Callier Centre for Communication Disorders of University of Texas/Dallas, 1966 Inwood Road, Dallas, Texas, 75235; 1975.

Test format: A linear scale composed of subscales in Motor Development, Perceptual Development, Daily Living Skills, Language Development and Socialization. Each subscale is made up of sequential steps describing developmental milestones. Administration is based on observation of behaviours which typically occur in conjunction with classroom activities.

Age: 0-9 years

Purpose: A developmental scale designed specifically to aid in the assessment of deaf-blind and multi-handicapped children. It is particularly comprehensive at the lower developmental levels, but may be used in conjunction with other assessment devices for higher functioning individuals. It provides a resource but not a teaching program, for planning developmentally appropriate programs for individual children.

CARROW TEST OF AUDITORY COMPREHENSION OF LANGUAGE:

Elizabeth Carrow, Urban Research Group, 306 West 16th, Austin, Texas 78701; 1975.

Test format: Consists of a series of three pictures per page and questions requiring a pointing response from the child.

Age: 3 - 6 years

Purpose: (a) To measure auditory comprehension, and
(b) To diagnose areas of linguistic difficulty. The test allows comprehension assessment without verbal expression on the child's part. Requires pointing skills.

COLUMBIA MENTAL MATURITY SCALE:

Bessie B. Burgemeister, Lucille Hollander Blum and Irving Lorge, Harcourt Brace Jovanovich Inc., 757 Third Avenue, New York, N.Y. 10017; 1972.

Test format: A series of cards with three to five drawings from which the child indicates the one that is unrelated to the others.

Age: 3 1/2 years to 13 years 11 months

Purpose: The CMMS measures general reasoning abilities which, when considered together with other pertinent information about the child, increases the understanding of his current capabilities. The use of the classification item format, which requires no verbal response and minimum motor response, makes the test particularly suitable for children with impaired physical and/or verbal functioning.

DEVELOPMENTAL POTENTIAL OF PRE-SCHOOL CHILDREN:

Else Haussermann, Grune & Stratton, Inc., New York; 1958.

Test format: Structured interview - a wide variety of tasks using standard materials (doll, toys, form boards, etc.). If an item is failed when given in the standard way, modifications are used until it is conclusively demonstrated whether or not the child can function at all in the particular area.

Age: 2 - 6 years

Purpose: Designed to permit an educational evaluation of the intellectual, sensory and emotional functioning of children who have handicaps in expression and other difficulties. The purpose of the evaluation is to find the potential for development as well as the obstacles present in the form of specific deficits. Manipulation and speech production are not required to indicate responses.

ENVIRONMENTAL LANGUAGE INVENTORY (ELI):

James D. MacDonald and Marjorie Nickols, The Nisonger Center, The Ohio State University, Ohio; 1974.

Test format: An informal diagnostic test. A game-like procedure is used to test ten semantic-grammatical rules. A non-linguistic cue is presented to the child from which a 'conversation' response and an 'imitation' response is required.

Age: All ages - with expressive sentences up to four words in length.

Purpose: The ELI was developed as a model for the diagnosis and training of children with severe delay in expressive language. It selects as the content for diagnosis and training those meaning units (semantic-grammatical rules) that comprise the first sentences of normally developing children. The semantic-grammatical rules are assessed in three production modes - conversation, imitation and play, in order to provide information useful in designing a program for establishing social communication.

ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES (ITPA, rev. ed.):

S.A. Kirk, J.J. McCarthy and W.D. Kirk, U. Illinois Press, Urbana, Illinois 61801; 1968.

Test format: Series of tests including record, pictures, picture blocks, and verbal expression tests.

Age: 2 - 10 years

ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES (cont'd.):

Purpose : The tests attempt to assess comprehensively many related activities with language. Consists of 12 parts measuring Auditory Reception, Visual Reception, Visual Sequential Memory, Auditory Associations, Auditory Sequential, Visual Associations, Visual Closure, Verbal Expression Grammatical Closure, Manual Expression, Auditory Closure, Sound Blending.

LEITER INTERNATIONAL PERFORMANCE SCALE :

Russell Graydon Leiter and Grace Arthur, C.H. Stoelting Company, 1350 South Kostner Avenue, Chicago, Illinois 60623; 1959.

Test format: The child's task is to match blocks to pictures mounted on a 'response frame'. Directions are pantomimed. Tasks range from matching of colours and forms to completion of patterns, analogous designs, classification of objects. There are three batteries organized by age levels.

Age : 2 - 18 years

Purpose : A non-verbal scale for young children yielding both Mental Age and I.Q. It requires no verbalization on the part of the examiner or child and has no time limits. It reaches down to lower chronological age levels than other performance scales, the lowest tests being tests of ability to learn rather than tests of acquired skills.

MCCARTHY SCALES OF CHILDREN'S ABILITIES (MSCA):

Dorothea McCarthy, The Psychological Corporation, New York, N.Y. 10017; 1972.

Test format: The MSCA measures six aspects of a child's thinking, memory and motor abilities with toy-like materials and game-like tasks.

Age: 2 1/2 - 8 1/2 years

Purpose: The MSCA were designed to satisfy the need for a single instrument to measure general intellectual level as well as strengths and weaknesses in important abilities. The test is useful for assessing mentally retarded children since the battery includes a number of "easy" tasks designed for very young children.

THE MILLER-YODER TEST OF GRAMMATICAL COMPREHENSION:
(Experimental Edition)

J. Miller and David Yoder, Department of Communication Disorders, 1975 Willow Drive, Madison, Wisconsin; 1972.

Test format: Consists of receptive items composed of four black-and-white line drawings per card requiring a pointing response from the child.

Age: Up to 6 years

Purpose: A diagnostic instrument concerned with the analysis of syntactic structures. Although the test is not standardized it has been used with the mentally retarded and is particularly adaptable to the language-impaired individual in that oral responses are not required.

NORTHWESTERN SYNTAX SCREENING TEST:

Laura L. Lee, Northwestern U. Press, Evanston, Ill.; 1971.

Test format: Consists of receptive and expressive items composed of four pictures per page and questions requiring a pointing or oral response from the child.

Age: 3 - 8 years

Purpose: As a screening instrument, but not a measurement of the child's language skills. Useful as a short test for screening large numbers and in conjunction with other tests as a diagnostic tool. Concerned only with syntactic structures. Requires pointing and vocalization to complete both parts.

PEABODY EARLY EXPERIENCE KIT (PEEK):

Lloyd Dunn, American Guidance Service, Inc., Publishers Building, Circle Pines, Minnesota; 1975.

Test format: 250 daily lessons composed of four varied experiences or activities involving puppets, toys, pictures, records, story cards.

Age : 2 - 4 years

Purpose : PEEK is a self-contained kit of lessons and materials designed to promote the affective, cognitive and oral language development of young children through group instruction. It is designed primarily for average three-year-olds but could also be useful with older learning disabled and retarded children.

PEABODY PICTURE VOCABULARY TEST:

Lloyd M. Dunn, American Guidance Service, Inc., Publishers Building, Circle Pines, Minnesota 55014; 1965.

Test format: A series of four pictures per page requiring that the child responds by pointing or "yes/no" indication.

Age: 2 1/2 - 18 years

Purpose: PPVT was designed to provide an estimate of a subject's verbal intelligence through measuring his hearing vocabulary. Since responses are non-oral and pointing is not essential, it is made appropriate for the speech impaired and physically handicapped as an indication of his receptive vocabulary.

PORCH INDEX OF COMMUNICATIVE ABILITY IN CHILDREN (PICAC):

Bruce E. Porch, Consulting Psychologists Press, 577 College Avenue, Palo Alto, California 94306; 1974.

Test format: The test consists of Basic and Advanced Batteries with 30 subjects in total. All subtests (except geometric forms) revolve around ten common objects. The subject responds by talking, gesturing and writing.

Age : 2 - 12 years

Purpose: The primary function of the PICAC is to quantify the subject's level of ability on common communicative tasks. Through its use, the clinician may obtain general and specific levels of output ability and make inferences about input and integrative ability.

PRE-SCHOOL LANGUAGE SCALE AND MANUAL:

I. Zimmerman, U. Stein and R. Evatt, Charles E. Merrill Publishing Company, Columbus, Ohio; 1969.

Test format: Consists of a series of picture tests in which the child responds by pointing and play tests in which child follows instructions with blocks.

Age: All ages assumed to be functioning at pre-school or primary language level.

Purpose: It tests auditory and verbal ability, and also has a separate articulation section. Areas are arranged to assess repetition of sounds memory, ability to distinguish parts, colours, prepositions and other parts of speech, textures, etc.

RECEPTIVE-EXPRESSIVE EMERGENT LANGUAGE SCALE (REEL):

The Bzoch-League, Anhinga Press, 420 Boulevard, P.O. Box 13501, Gainesville, Florida, 32604; 1970.

Test format: A series of categories established in one to three month intervals defining behaviours, vocalizations, and early speech patterns. No test situation - strictly observation.

Age: Infants 0-36 months in 22 separate divisions.

Purpose: To measure receptive and expressive language skills in infancy, based on standard established by the test.

REYNELL DEVELOPMENTAL LANGUAGE SCALES:

Joan Reynell, N.F.E.R. Publishing Company, 2, Jennings Buildings, Thames Avenue, Windsor, Berks., England; 1969.

Test format: A comprehensive set of tests for separated receptive and expressive evaluations, composed of toys which must be used according to instructions by the tester. Form B was designed specifically for the physically handicapped child who has difficulty pointing.

Age: 1 - 5 years

Purpose: Designed so that expressive language and verbal comprehension can be assessed entirely independently, in that the verbal comprehension scale needs no spoken response, and the verbal comprehension needed for the expressive language scale is minimal. The scales are defined as to distinguish clearly the progress made over six months of development, and to allow a qualitative as well as quantitative assessment. They follow a developmental orientation based on normal patterns of language development.

SEQUENCED INVENTORY OF COMMUNICATION DEVELOPMENT (SICD):

Dona Lea Hedrick, Eliz. M. Prather and Annette R. Tobin, University of Washington Press, Seattle, Washington 98105; 1975.

Test format: Through the use of some 100 objects, supplied in the kit, receptive and expressive items are tested. The resulting Communication Profile provides information with respect to sound and speech discrimination, understanding, imitating, initiating and responding, syntactic structures and articulation.

SEQUENCED INVENTORY OF COMMUNICATION DEVELOPMENT (cont'd):

Age: 4 months - 4 years

Purpose: The SICD is a diagnostic test designed to evaluate the communication abilities of normal and retarded children as well as children with specific language disorders. Its primary usefulness is in the illustration of the sequenced communication behaviours in young children.

STANFORD-BINET INTELLIGENCE SCALE:

L. Terman and M. Merrill, Houghton Mifflin Company, Boston; 1960.

Test format: Tasks to be performed by the subject run the gamut from simple manipulation to abstract reasoning. Toys, form boards, blocks, beads, etc. are used. A large number of tests at the lower level involve the observation and identification of common objects - perceptual discrimination tests play a major role as well.

Age: 2 - 18 years

Purpose: The Stanford-Binet is a standardized 'intelligence' test designed to provide an I.Q. score, indicating the individual's "general intellectual level". A wide variety of tasks are presented to the subject in the expectation that an adequate sampling of all important intellectual functions will thus be covered.

C. Program of Symbol Instruction

This section will present a framework and suggestions for program implementation based on the clinical experience of symbol instructors, supplemented, when relevant, with the Evaluation Study statistical findings. The results obtained from the quantitative data analysis have been considered as offering an additional dimension to the recommendations of instructors and are included in this section when they can broaden the instructor's rationale for decision making. (See Appendix 2(b) Handbook). The reader is urged to examine the Evaluation Study as well, and to critically consider its reports for their programming implications.

Throughout the Evaluation Study, the wealth of information obtained regarding programming seemed to relate to four levels:

1. The instruction given to the individual symbol user;
2. The classroom program;
3. The extended settings in which the symbol user functioned: i.e. the school or centre in which the program was situated and the symbol user's residential setting;
4. The community in which the symbol program was located.

The Program section will include suggestions and ideas relating to each level. The importance and interdependence of all levels cannot be over-emphasized; attention to each is essential for a successful ongoing program.

PROGRAMME LEVELS



Recommendations for specific content and procedures will not be made. Each instructor will need to devise her own curriculum and instructional approach, relating to the student, the immediate instructional environment, the setting in which the program is located, the family and the community. The suggestions and information which follow are offered as a reference guide from which, it is hoped, each instructor will develop a program to meet each student's needs.

1. SYMBOL INSTRUCTION FOR THE INDIVIDUAL SYMBOL USER INITIAL CONSIDERATIONS:

One important principle emerges from the Evaluation Study:

There is no "one way" to program
for the learning of Blissymbolics.

There are, however, several "program approaches", which can be related to the models outlined in the introduction to this section (see p. 89). The considerations which follow should assist the instructor in identifying the most suitable "approach"; the approach can then be utilized to arrive at program content and procedures.

(a) Consider the Individual:

The need to relate to the student and to individualize Blissymbol instruction is emphasized in every informational source included in the Evaluation Study. As discussed in the Assessment section (p. 93) the student's complex matrix of communication needs and communication potential, his intellectual, physical and academic capabilities, his social and emotional needs, his motivational and frustration levels, the residential, instructional and community situations, the attitudes of significant others - all interact to establish an individual situation with regard to the utilization of Blissymbols. The instructor should be aware of each student's unique circumstances through consideration of the student's strengths and weaknesses with regard to:

- (i) variables which have been found to be statistically significant predictors of the inexperienced symbol user's SYMSKILL, such as:
1. *Ability to deal with listener's misunderstanding*
 2. *Number of symbols related to*
 3. *Interest in creating new symbols*
 4. *Speed of learning symbols*
 5. *Assessed I.Q.*
 6. *Number of symbols in best sentence*
 7. *Number of settings*
 8. *Number of symbols in typical sentence*
 9. *Alertness*

(See monitor variables and predictor variables, Data Analysis section, p. 32, Evaluation Study).

and

- (ii) variables which have been shown to differ between HI and LO SYMSKILL achievers, such as:
1. *Interest in communication*
 2. *Ability to deal with listener's misunderstanding*
 3. *Speed of learning symbols*
 4. *Interest in creating new symbols*
 5. *Attitude to learning new symbols*
 6. *Reading score*
 7. *Assessed I.Q.*
 8. *Observed I.Q.*
 9. *Alertness*
 10. *Visual problems*
 11. *Smallest picture size*
 12. *Number of symbols related to*
 13. *Auditory attention*
 14. *Ability to learn auditorily*

(See "assessment-related variables", Assessment section, p. 66, Evaluation Study).

(b) Decide upon the Most Appropriate Model within which to Provide an Approach:

- Model 1: Utilizing Blissymbols as an expressive language augmenting a developed receptive native language;
- Model 2: Utilizing Blissymbolics as an expressive language paralleling and contributing to the development of native language;
- Model 3: Utilizing Blissymbolics as a surface communication system.

(c) Define the Short- and Long-Term Objectives

(d) Decide upon the Appropriate Teaching Style

(e) Consider the System:

The capabilities of Blissymbolics must be understood and evaluated with regard to the needs of each prospective symbol user. A thorough study of the Blissymbol System found in this Handbook, and utilization of Semantography and The Book to the Film as references, is essential.

Due to the highly individualized nature of symbol instruction, it is important that one instructor be designated as being responsible for the program planning and implementation. Once this has been done, communication procedures should be established with all those who have regular contact with the symbol-user. Failure to make these provisions can result in gaps in programming and lack of follow-through.

GENERAL SUGGESTIONS¹:

(a) Use Blissymbolics to Communicate:

Instruction should include learning Blissymbolics and simultaneously learning how to use symbols to communicate effectively. Immediate opportunities should be provided to demonstrate and utilize purposefully new symbol learnings.

¹These program suggestions were obtained from research instructors and are directed primarily toward the application of Blissymbolics within Model 1; many of them would pertain also to Models 2 and 3.

(b) Total Immersion in Blissymbol Communication:

Total immersion, or as near as possible to total immersion, is the recommended approach if symbol-users are to integrate Blissymbols into their way of relating to their world. Communication should be arranged with a wide range of persons in the environment; symbols should be incorporated into play and learning materials; symbols should be used in every setting in which the symbol-user interacts with others. Communication should not be a part-time activity.

(c) Remember the Listener:

Interaction means that a 'listener' is always involved as the receiver of the symbol communication. Attention in programming must be given to informing and meeting the needs of this listener. This can best be done by means of specific written instructions which provide simple steps to successful communication. These instructions should always accompany the symbol-user's display. (See Appendix 9: Hello my name is "Nikki".) A general orientation both to the Blissymbol system and to the art of communicating with a non-speaking person is also valuable information to include on or near the symbol-user's display.

(d) Be Creative:

Learning occurs most effectively when the instructor informally and spontaneously presents information related to the symbol-user's immediate needs and interests. Flexibility and creativity, on the part of the instructor, are ongoing requirements for a successful Blissymbol program.

(5) REMEMBER, A PRIMARY OBJECTIVE IS COMMUNICATION

Games, worksheets, toys and stories are valuable aids to symbol instruction, but they should never become the primary focus of the program. Their role is to supplement and reinforce Blissymbol learnings in order that successful communication with the symbols can be achieved as quickly as possible.

(f) Write the Symbols:

Since Blissymbolics is a visual system, and models of output are limited, it is important to make a written record of symbol statements whenever possible. This provides both the symbol-user and the listener with experience in relating to entire symbol sequences and offers the opportunity for review and rehearsal of symbol "language patterns".

SPECIFIC SUGGESTIONS FOR PRE-SYMBOL PREPARATIONS:

(a) Be Sure Symbol-User is Properly Positioned:

Appropriate seating can mean the difference between being able to point to symbols and having to rely on a less direct means of indicating the symbols. (See Physical Functional Considerations section, p. 63.)

(b) Do not Postpone Communication, Waiting for a Sophisticated Technical Aid:

If an alternative to pointing to symbols is required, utilize interim procedures such as vocabulary coding systems, gross fist pointing, eye pointing and/or finger scanning by the listener. At the same time, explore the feasibility of various interfaces and electronic or electro-mechanical aids (see Appendices 3 and 4).

(c) Use Most Appropriate Introductory Symbol Display:

See Vocabulary section (p. 160) for information regarding selection and arrangement of symbols. Be sure the symbol user will have access to all symbols on his display or that a means for indicating the symbol will be provided (for example, scanning by the listener, with instruction appearing on display). If the symbol-user is mobile, prepare a display which is light, durable, easily carried and convenient. Also position displays at strategic places in his environment. Provision should be made for symbols always to be available.

(d) Prepare Interesting Teaching Aids:

Toys, games, books and worksheets are needed which match the developmental level of the symbol user (see Appendix 6).

(e) Provide Preliminary Information to Potential Listeners:

The symbol-user's peers and parents, the staff and administrators need preparation in order that they will be receptive to the symbol system and the program objectives. Encourage their involvement and support. (See Appendix 9.)

PROGRAMME IMPLEMENTATION:Initial Stage:

The initial symbol program usually includes:

1. Visual matching and discrimination of symbols;
2. Identification of a selected group of basic symbols (in programs for the trainable and severely retarded attention was directed toward learning the verbal label as well as visually identifying the symbol);
3. Locating symbols within a group arrangement;
4. Using the basic symbols in communicating;
5. Establishing the necessary physical arrangements (See the Physical Functional Considerations section, p. 63.)
 - locating the symbols within reach of the user,
 - obtaining proper seating,
 - providing some alternative if pointing is not possible,
 - providing instructions for the listener;
6. Developing or expanding the student's motivation to communicate - within the classroom, at home, and elsewhere - through providing successful experiences;
7. Increasing the student's attention span within communication activities;
8. Encouraging spontaneous use of the symbols;
9. Expanding language comprehension through symbol and non-symbol strategies.

Intermediate Stage:

At the intermediate stage, attention is generally directed toward:

1. Extending vocabulary;
2. Simple sequencing of symbols (agent, action, object);
3. Introduction of strategies:

- combine	- sounds like
- opposite	- initial consonant
- like	(when appropriate
- plural	to student)

4. Introduction of tenses;
5. Questioning;
6. Attending to symbol parts and using Semantography as a reference;
7. Generalizing to an expanded meaning, rather than relating to the specific word under the symbol;
8. Utilizing symbols as a medium for other learning activities;
9. Emphasizing writing and reading messages in symbols;
10. Integrating symbol conversation into many experiences.

Advanced Stage:

At the advanced stage, the program can emphasize:

1. Order of symbols; more complex sentence structure; variety of sentence forms;
2. Expanded length of symbol utterance (see Syntax section, p. 32);
- (3) Use of wide vocabulary;
4. Varying the style of output to accommodate different levels of skill in the listener; being a good conversationalist;
5. Use of advanced symbol strategies:
 - *relativizer*
 - *exclamation mark for intensity*
 - *big/little meaning*
 - *symbol part*
 - *symbol position*
6. Use of non-symbol strategy of spelling and continued use of initial consonant;
7. Relating to complex ideas with symbols;
8. Story writing;
9. Creative use of system;
10. Relating symbol-reading skills to word-reading;
11. Improving skill in creating symbols;
12. Improving questioning;
13. Introduction of negative.

The program stages reported by Evaluation Study instructors supported the observations made of the progress of the first symbol-users:

The children move through many levels as they gradually acquire skill in symbol communication. In the initial stages, each child must learn that symbols fulfil the same function as speech and he must learn the symbol-meaning for each symbol as it is introduced. It is important that the child use each symbol as soon as he knows its meaning. It must become part of his "speech" immediately. He must develop speed in locating symbols and gradually be taught that each symbol represents a range of meaning, not just one word. As the child advances, he learns to use the logic of the symbol system, recognizing and utilizing the component parts of the symbols, and employing symbol strategies to expand his vocabulary. When the child arrives at a level of spontaneous automatic symbol communication and when he can adapt his style of symbol output to the varying symbol abilities of his "listeners", the emphasis in his learning program can be transferred from communication to other areas of academic concentration.¹

INTRODUCTORY PROGRAM:

In offering specific suggestions regarding initial programming, the three models previously described are used as guides to demonstrate three introductory symbol programs. As previously stated, (See Introduction section, p. 89), each of the three models is to be considered as providing a general framework to assist in the planning of specific programs. The models are not well-developed theoretical structures to which students must be matched. Ideas for a student's symbol instruction can be derived from all three of the program composites which follow.

¹The Book to the Film 'Mr. Symbol Man', p. 146.

Within Model 1:

Utilizing Blissymbolics as an expressive language augmenting a developed receptive native language.

1. Select two symbols with high interest and relevance to the student and which are visually dissimilar; explain their meanings and compositions in a manner appropriate to the student's developmental level.
2. Provide props, for example, pictures and/or experiences to reinforce and expand the student's comprehension of the symbol's meaning.
3. At the initial stage, each time a symbol is responded to or initiated by the instructor, reinforce the student's learning by pointing to the symbol on the display, saying its meaning, and (whenever possible) writing it as part of a sequence.
4. Plan conversations and activities so that the student will have the opportunity to use the symbols immediately through responding to planned questioning and through informal conversations.
5. Arrange for the student to share his new symbols with his classmates and his parents and to have opportunities for ongoing usage of the symbols (e.g. review activities throughout the school day, homework activity or a note to inform parents).
6. Test symbol identification and usage the following day. If the student demonstrates that he knows the symbols, introduce two new symbols and proceed to Step 7.

If the student does not know the symbols, re-explain, demonstrate again, and use in conversation and in activities. Follow the recommendations in Steps

2 - 5 and then re-test the third day. If symbols are still not known, choose two other symbols and repeat Steps 1 - 5. If after introducing six to eight symbols, there is no identification or appropriate usage of any symbols, review assessment findings and reconsider the model being utilized.

7. Proceed with gradual expansion of the vocabulary, always planning opportunities for regular usage of all symbols on the display and for communication with a variety of persons.
8. As the number of symbols available to the student grows, plan exercises for speed in locating symbols.
9. Provide activities for increasing the time in which the student is involved in communication and which encourage spontaneous utterances initiated by the student.
10. Continue to expand the experiences of the symbol user so that he will have increasing opportunities to utilize his communication skills and to receive feedback as to the appropriateness or inappropriateness of his symbol usage.
11. Always encourage creative and spontaneous use of the symbols.
12. Gradually introduce symbol strategies (see p. 13) and a structure for sequencing the symbols (see p. 32).
13. Work toward a sophisticated, comprehensive usage of the system.

Within Model 2:

Utilizing Blissymbolics as an expressive language paralleling and contributing to the development of native language.

1. Consider symbol instruction or symbol readiness activities as part of a dual treatment approach. Initiate symbol instruction while continuing to facilitate improved physiologic support for speech.
2. Emphasize the total developmental needs of the child. Make the program relate to the child's social and cognitive growth.

3. Incorporate symbols into all phases of the program. Relate symbols to themes, objects and experiences; integrate symbols into toys, songs, snack time, stories and play activities.
4. Provide opportunities for imaginative and representational play where one object or activity stands for another.
5. Introduce symbols as the need arises, spontaneously, and within a situational context.
6. Provide symbols for functional communication regardless of the level of the symbol expression. Be accepting of utterances containing one symbol.
7. Concentrate upon the building of a vocabulary and the widening of concepts.
8. Do not attempt to teach syntax directly; rather as the instructor, provide oral and visual methods (through symbol messages, stories, sequencing games) which enable the student to acquire syntax rules. Assist others who communicate with the student to present models consistent with the language developmental level of the student. The symbol model utilized by the "listener" should be that of the next level to which the student can move (Miller and Yoder, 1974). Look for development in length and format of sentences as the child's experience expands his perceptual-cognitive awareness of objects and events and he becomes ready to express his ideas more fully and explicitly.
9. Encourage relating with speaking peers within the classroom and through planned integration experiences.
10. Most instructors working with the young child would suggest beginning with pictures, rather than "babyfying" symbols, and then moving directly to symbols. This area requires further investigation.

11. Help the child feel that his symbols are something special which belong to him.
12. Include the parents within the program from the beginning. Reassure them that symbol communication will not discourage speech (see Speech and Language Development section, Evaluation Study, p. 80) and assist them in relaxing and enjoying symbol conversation and symbol games with their children. Teach the parents the logic and structures of Blissymbolics and try to help them develop a positive attitude toward symbols as an augmentative communication system.
13. Provide the symbol-user with opportunities for the social interactions that normally take place for speaking children.
14. Use the techniques from oral language training whenever applicable to symbol instruction.
15. Introduce symbols which are pictorial and visually dissimilar whenever possible.
16. Relate symbol vocabulary selection to functions expressed in early word utterances: e.g. request - "move", nonexistence - "no", disappearance - "away, all gone" (Miller and Yoder, 1974, p. 514); and to pre-school activities: e.g. make-believe games, play partners, and substitution of one object for another.

When this model is applied to the instructional program of the trainable retarded symbol-user, many of the above suggestions (such as Steps 2 through 16) will influence the content and process of the program.

However:

- (a) There will likely be a reduced emphasis on facilitating the physiologic support for speech,
- (b) Program procedures will be influenced by the degree of structure required by the student, as demonstrated in other instructional situations, and

- c) Vocabulary selection will be influenced by the functional communication requirements related to independence in daily living skills and by vocabulary needs related to functioning at a pre-school level.

Within Model 3:

Utilizing Blissymbolics as a surface communication system.

1. Assess the immediate communication needs of the students and those with whom he interacts.
2. Establish specific performance objectives, which will allow the symbol-user to effect a response from his environment and which will meet his specific needs: For example, asking for a drink; choosing an article of clothing to wear; expressing a desire to share an activity with a friend.
3. Analyse the sequence of skills to be acquired by the student in order to arrive at the target behaviour. For example:

The sequence of skills in asking for a drink could involve: recognizing thirst; distinguishing between drinks and foods; learning the verbal label for drinks and foods; learning that drinks quench thirst; distinguishing between the symbol for drink and the symbol for food (this task could be further broken down after analysing the skills required to distinguish between the two symbols); relating the symbol for drink to one drink and the symbol for food to one food; learning the verbal label for the symbol for drink and the symbol for food; learning that through pointing to the symbol for drink, certain persons in the environment will provide that particular drink; learning that the symbol for drink can apply to all drinks; learning to distinguish between different drinks and to specify specific drinks through additional cues such as colour. (See also Step 10, this section.)

4. Implement a program which trains the skills in a sequence, providing positive reinforcement, and sufficient practice and review at each skill level.
5. Work on one skill at a time and always within a meaningful context.
6. Pre-test for knowledge of verbal labels. Be prepared to concentrate on the learning of verbal labels for activities and objects prior to the learning of symbol-meaning associations.
7. Choose: symbols which are pictorial (see Vocabularies section, p. 160, regarding considerations as to the addition of colour and supplementary details to the symbols); symbols which are visually dissimilar; symbols which relate to concrete objects or persons present in the immediate environment; symbols which are immediately functional (e.g. symbol for "more").
8. Select a target vocabulary which is limited to a small number of symbols.
9. Do not explain component parts, rather try to relate the symbol configuration visually to the object or person it represents.

10. Begin with programed activities which focus on:
 - (a) Matching symbols, matching symbol with an object, matching symbol with a picture;¹
 - (b) (i) Selecting symbol from small group about three of symbols:
 - with verbal cues,
 - with pictorial cues;
 (ii) Selecting symbol from large group about 10 of symbols:
 - with verbal cues,
 - with pictorial cues.
 - (c) Identifying and locating on a symbol display a symbol which is reduced in size.
11. Keep instructions simple and direct, relating symbol
 - (a) to its visual match, (b) to its verbal label, (c) to its function; for example:
 - (a) "Show me the one like this" (indicating a visual symbol)
 - (b) "Show me the pencil"
 - (c) "Show me what you write with"
12. Following the acquisition of symbol identification and location skills, introduce activities which require sentence completion and answers to direct questions.
13. Teach through repeated experiences that a visual representation (symbol) can serve as a communication signal; for example, each time the student points to the symbol for food, he receives another helping.
14. Gradually increase the time spent in symbol-related activities.
15. Parallel the skill development activities with the training of a symbol communication signal which relates to an activity of daily living or to a recreation choice.

¹Further study is needed as to the need for this step within Model 3. See discussion in closing remarks (p. 233).

16. If simple symbol sentences, rather than individual symbols, would be more socially acceptable in the symbol-user's environment, consideration can be given to training sentence units of two and three symbols, utilizing the procedures already described. e.g. "Please - drink." "I - need - toilet." Train one sentence pattern at a time.
17. Try to provide on the display all the symbols required rather than expect the use of symbol strategies to extend the vocabulary.
18. Plan much repetition and frequent review in order to acquire and retain symbol skills.
19. If the student demonstrates the ability to initiate symbol communication independently, or to use symbols in an innovative way, be prepared, at any stage, to transfer to Model 2.

SUGGESTIONS REGARDING THE PROGRAM BEYOND THE INITIAL STAGE:

As the instructional program moves beyond the initial stage, the instructor should feel more confident about the appropriateness of the model selected. If Model 3 is being utilized successfully, consideration can be given to estimating the total number of symbols to be provided and the number of communication situations for which the student will be prepared. Training toward these objectives can then proceed as recommended for the introductory program (p. 149).

If Model 1 or Model 2 have been found to be most appropriate, the following areas will require the instructor's attention.

(a) Increasing the Symbol-User's Knowledge of Symbol System:

The instructor can use as reference Semantography (Bliss, 1965); The Book to the Film 'Mr. Symbol Man' (Bliss, 1975); and the Handbook sections on the system, which include strategies, syntax and vocabularies. Expectations and program objectives with regard to each of these areas can be guided by the model which proves most helpful.

Worksheets can assist in the student's learning of the system (see Appendix 7). Areas which can be covered include:

1. Symbol discrimination:
 matching: two the same; find one that is different;
2. Relating symbols to classifications and concepts;
3. Matching symbol with meaning as portrayed in picture;
4. Strategies:
 opposite, combine, part of, plural;
5. Symbol composition:
 add missing part; unscramble parts; group the symbols sharing common element.

In changing from one vocabulary level to another (for example, from the 100 display to the 200 display) several alternative approaches are available to the instructor:

1. The larger grid can be presented blank to the student and known symbols can be re-positioned. New symbols can be added to the grid as they are learned. This process can be supplemented by a large classroom grid to which symbols are added, as acquired by individual students.
2. The larger display can be presented with all unknown symbols covered with an easily removable tape. As new symbols are introduced, the tape can be removed, gradually revealing the entire display.

3. The background for the symbols can consist of permanent coloured surfaces upon which symbols for an individualized display can be added as required. No sudden change of vocabulary levels is required, only a slight shifting of symbols to appropriately position new symbols. (See Appendix 3b.)
4. The larger display can be presented with all known symbols having the background of their spaces coloured and all unknown symbols having their spaces bordered with colour. As symbols are learned the entire surface of the symbol can be coloured.
5. The new display is presented in its entirety; the student is assisted in locating known symbols; he is encouraged to use it and to ask questions about any symbols he wishes to learn. This approach would be applicable primarily to students who are confident enough to ask questions, who are not upset if others think they know more than they temporarily do, who have some knowledge of written words, and who learn quickly. For such students the adjustment to a new display can be a rapid and exciting one.

(b) Vocabularies:Suggested Physical Organization and Arrangement of Symbol on Displays.

An extensive variety of suggested formats for symbol displays was gathered over the five recording periods of the research project. One single factor seemed to occur over and over, no matter how innovative the organizational proposal was. Above anything else, instructors were most concerned with providing a symbol display which best suited a child's physical abilities. Only 50 per cent of the population chose to use O.C.C.C. displays in December 1974. However, 78 per cent of the population reported use of O.C.C.C. displays one year later. It appears that more people were taking advantage of pre-organized displays for their students.

It is speculated that instructors were taking advantage of ready-made displays for the sake of expediency and efficiency as their students progressed in their skills with symbol communication. Individualized displays were more widely used to tailor-make introductory displays for "new" symbol-users.

The following list was compiled of suggested formats for the organization of a display other than that used on O.C.C.C. displays:

1. Arrangement according to Fitzgerald Key:

people	verbs	prepositions articles conjunctions	adjectives adverbs	things objects	places	times	social amenities
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2. Organize according to frequency of use and ease in locating symbol.
3. Left-right progression such as O.C.C.C. but use of quadrants outlined with dark lines enclosing six to nine symbols for gross fist and eye pointing.

4. Book presentation, pages held together with binder rings which enable additional pages to be added when necessary.
5. Grouped categories into horizontal squares as opposed to vertical rows already in existence on O.C.C.C. displays.
6. Blank sheet with symbol grid outline, display assembled as each new symbol is learned - suggested use of gumback paper or symbol stamps.
7. Position of printed word accompanying each symbol was queried-- above versus below symbol--as children often cover the printed word when it appears below the symbol to which they are pointing.

Suggestions were also compiled concerning ways of visually colouring displays:

1. Colour coding on initial presentation of symbol to develop awareness at early stage.
2. Colour code by categories --people, places, feelings, actions, etc.
3. Symbol squares are left black-and-white; only the boundaries are colour coded to distinguish parts of speech.
4. Symbols in book organization, each page is coloured according to the category represented to facilitate speed in locating symbol desired.
5. Black-and-white displays, colour coding only those symbols used by the child.
6. Shading of each colour for further distinction characteristics, i.e.: time concepts.

Having taken all these proposals for organization into consideration, instructors tend to agree that no matter what physical structure is selected for a symbol display, the goal is to maintain a communication system and to accept all communicative output, restructuring afterwards. The majority of instructors prefer an organization which in some ways encourages a natural left to right progression in sentence development. No single format or arrangement will work for every child. Adaptations and combinations of many assortments must be sampled to arrive at the best selection alternative.

(21) Symbol Selection. Just as the optimum arrangement and colour coding techniques are best achieved through a trial and error analysis, so too is the selection of symbols for a display. Ideally, vocabulary selection criteria should be largely dependent on the unique characteristics of each individual symbol-user in an attempt to offer an alternative communication system which will maximize each child or adult's potential for growth and maturity.

Information concerning this issue of vocabulary selection was gleaned through interviews with instructors in the sub-population. The following list is a compilation of many of the ideas which were found to be successful. Further discussion for selection criteria under specific age categories will follow.

What symbols should I select?

1. Symbols appropriate to child's need and capabilities;
2. Symbols which are visually similar to what they represent;
3. Symbols a child can readily "talk" about and use;
4. Symbols requested by the child;
5. Body parts --provide easy transition to use of verbs;
6. Symbols recommended by the immediate family;
7. Symbols representing basic concepts;
8. Symbols from B.C.F. basic 30 symbol vocabulary which are visually most dissimilar from each other;
9. Greetings --important to gain attention and an immediate reward;
10. Symbols selected with careful consideration given to a child's visual perceptual skills.

See Evaluation of Vocabulary Usage, Evaluation Study (p. 37) and Appendix 4a, Tables 34 and 36, Evaluation Study, for detailed information relating to vocabulary selection derived from Evaluation Study findings.

Age Categories

(i) Non-retarded 0-5 Years. It was generally agreed that the main focus of attention should be directed towards individual programming based on each child's needs and capabilities as it was deemed important to provide the child with opportunities to "talk" about things that are important to him at that particular time in his life and which may not necessarily hold the same importance to another child. Generally these symbols are selected for at least one of the following reasons:

1. Child's request;
2. Family recommendations;
3. Symbols selected which were visually most dissimilar;
4. Perhaps a more general statement where consideration is directed towards the visual configuration of the symbol, relative to a child's visual perceptual skills;
5. Greetings were deemed important to gain an immediate reward.

Once these initial considerations were taken care of, there were a number of additional suggested methods of procedure. The question of the core vocabulary for the young symbol child was considered. Opinions were equally divided on this issue. Half the instructors felt that the vocabulary of the basic 30 symbols already provided by the Blissymbolics Communication Foundation was an adequate introduction to

symbols. The other half of the instructors felt that each child's individual program needs were too specific to consider the basic 30 symbols as a core vocabulary for each early symbol use. Unique vocabularies compiled primarily on the basis of need were felt to more adequately suit individual cases.

It was generally agreed that a wide exposure of the child to many symbols, by labelling objects in his immediate environment (i.e. home and schoolroom), was an important adjunct to establishing receptive vocabulary skills before asking for expressive output. It was noted that the very young child from 0-3 years may develop a better understanding of a symbol meaning when some small adaptations appeared on the symbol making it slightly more pictorial and representative of the object it represents.

i.e.



to



However, it is important that the basic symbol is not altered in any way if standardization is to be achieved. Furthermore, it should be noted that many instructors find that these "additions" to the symbols require "unlearning" at a later stage in symbol communication. Many instructors felt that the symbol paired with an associated picture would be an easier way to establish the relationship desired. The picture could be phased out when the child demonstrated a firm knowledge of the concept and appropriate use of the symbol.

Basic symbol selection for this group should also include body parts, which allow for an easy transition to verbs with the addition of the action indicator, as well as symbols representing basic body concepts which help a child establish body awareness. Manner symbols were not found to be of any significant use for early symbol use. Instructors strongly agreed that one should deal in specifics (i.e. concrete

objects to see, feel and hear) rather than generalizations. Decision-making situations where the young child is asked to make a choice are very important to establish at an early stage of development in symbol communication. The young child must learn that he can, in fact, effect a change in his environment. The ability to make a choice of play activity contributes to the young child's self-image as a communicating individual.

The majority of the instructors strongly supported the early introduction and establishment of yes/no patterns. However, some argued that it may be more meaningful to the child to make a choice between two real objects than between two feelings. There was general agreement as to the early introduction of colour coding of symbols for people, objects and actions, both as cues for learning and with a view towards influencing future sequential syntactical patterns. While a question was raised as to whether the printed word should be placed above or below the symbol, instructors continue to place the written word under each symbol, almost without exception.

Perhaps the most important consideration in initial symbol selection is the selection of symbols which are meaningful to the young child and in keeping with his experiential background and his physical and intellectual skills.

(ii) Non-retarded 6 Years and Over. In selecting symbols for this age group, one must consider the wide range of ages and interests to be covered. It was generally agreed in group discussions that a number of areas had to be considered.

- (a) The child and his environment - the institutionalized child versus the child living at home--interest would, of necessity, be very different in each case.

- (b) Pictographic symbols, as is the case with the young child, were considered necessary in early vocabulary options - symbols which can be easily learned and used immediately should be given prime importance.
- (c) Mixed feelings were reported with reference to the procedure of introducing only those symbols which the child would use, as opposed to exposing the child to a great variety of symbols in spite of the seeming uselessness of some of the symbols at the time. Experience has indicated that a broad exposure to many different symbols contributes to a building of a receptive vocabulary. Caution should be exercised, however, so as not to overload the child and cause confusion with other known symbols.
- (d) Opinion was also divided with regard to the selection of symbols for concept development as opposed to selection for communication purposes.

This question was left unresolved, but it is the opinion of the authors that general communication should be the first priority in symbol selection. However, children communicating with symbols can also benefit from guidance and direction in concept development designed to develop a fuller and more complex skill in communicating.

- (e) The number of physical movements required to communicate a message should be minimized.

- (f) Further to the question of directed teaching, the "question" symbols present many problems. Instructors remained divided on the issue - some feeling several different question symbols were important for exposure, especially for the teacher, even if the child did not use them. In this instance one could teach by using the questions to elicit descriptions. Others opposed the presence of too many question symbols on a display, arguing that they were not used and were taking up precious space which could be better used for an expanded vocabulary in other areas.
- (g) The concept of a basic core vocabulary from which to expand in order to meet individual needs was supported by the instructors, who felt that a core vocabulary would be very beneficial at each stage of development. It was strongly suggested that the matrix size of the core should include a selection of symbols to permit the teaching of syntax. At the same time, special vocabularies suitable for conversations around specific themes were also seen as being invaluable for occasional use. Standardized displays at a 400 symbol level were felt to be necessary to facilitate inter-communication among the symbol-users themselves.

As each child's skills with the symbol system increase and the child becomes more effective in his symbol communication, finer and finer adjustments will be necessary to provide a display best suited for each individual.

(iii) Retarded 0-15 Years

The following is a summary of instructors' feelings regarding symbol selection criteria for this population:

- (a) In the initial stages of symbol introduction do not choose symbols which are visually dissimilar to the actual objects to be represented.
- (b) Associate pictures and symbols, particularly with the very young retarded this may be achieved by placing the symbol beside the corresponding picture in two columns.
- (c) Symbols should be immediately functional for the child - once their functional use is thoroughly established, then consider adding such refinements as "I want....".
- (d) Personalized displays with familiar people and family figures are considered necessary.
- (e) Parent requests and ward attendant requests for symbols must be seriously considered.
- (f) Selection should initially include the simplest, most pictorial and easiest to explain symbols, with expansion of vocabularies to include symbols which represent specific needs and things in the child's environment which he can use and control.

The overriding considerations in symbol selection are the basic individual characteristics of the child, his age and ability. Selected symbols must continually reinforce the concepts that enhance each child's image of himself as a person who can communicate. Positive rewards are extremely necessary to begin with, but once the child has passed that basic level of immediate fulfilment, it is still necessary

to Positively reinforce each communication attempt. Several suggestions were compiled to aid in the longer range planning of vocabularies for this age group.

- (a) Question symbols were found to be redundant and confusing at the 100 symbol level - one general question symbol was found to be sufficient.
- (b) Finer colour shading was found to facilitate the separation of symbols with fine conceptual distinctions, such as time concepts, today, tomorrow.
- (c) A small core vocabulary at a 100 symbol level was suggested, but instructors would like to see more individualized displays tailored to each symbol-user, depending on the level of intelligence of the child. The amount of inter-communication is low with this type of child and therefore, individualized displays geared more to adult direction were advocated.
- (d) The simplest and most readily accessible displays were also proposed-- machines and mechanical devices were not seen as very successful vehicles for communication with this population.
- (e) Most instructors continued to leave the printed word under each symbol even though many felt it should be placed above the symbol to prevent the child from covering it while pointing.

There was general agreement that total immersion in an environment in which symbols are placed as labels on all familiar objects added to the reality of symbols as a medium for communication. Experience with many symbols,

beyond those on each display served to more fully integrate the world of symbols into each individual's life experience.

(iii) Retarded 15 Years and Over. The program needs of the retarded adult symbol-user can be divided into three specific levels: (a) symbols which are relevant to the environment; (b) symbols which are familiar or similar to known themes such as Thanksgiving, Christmas, etc.; and (c) the development of a definite "yes/no" response in promoting and nurturing an ability to make a choice from a number of alternatives.

The premise for display arrangements is very similar to that for the younger retarded group. Symbols which are similar to each other in their configuration were difficult to grasp. Pictorial, directly representational symbols were the easiest to learn. Greetings and manners symbols were seldom used except "I'm sorry". Adaptations to the basic symbol components were found to be confusing to this retarded population. Associated pictures in combination with symbols were more helpful for the explanation of meaning. Instructors also felt that exposure to symbols before they were actually taught was not harmful or confusing to these adults. Once again, it was felt that one general question symbol was sufficient for this type of individual: subtle differences in types of question symbols were too confusing and were not being used.

A general conclusion was reached with respect to the development of a core vocabulary. Instructors were in accord that the present B.C.F. 200 display was too limited in scope at the present time. They felt that a core vocabulary, appropriate for each individual with accompanying suggestions for location on the display and a common source of additional symbols, would be ideal.

There seems to be one point which continues to emerge in all discussions. Even though experienced instructors advocate some specific vocabulary selections over others, the prime consideration in every case is the need of each individual symbol-user. Success depends to a large extent on the satisfaction derived by each individual through the use he makes of the system. Symbol selection therefore is never static, but always ongoing to meet the needs of each person as his knowledge of the world expands.

(c) Developing Skill in Communicating:

During the initial stage of instruction, the student is provided with experiences from which he can learn that communication is possible for him and that it is satisfying, interesting and valuable. During the next stage of instruction, the student needs experiences which will enable him to develop skill in communicating at different levels, in different situations, and with a wide range of people. The responsibility for successful communication will ultimately rest with the symbol-user and he requires guidance and many opportunities to "talk with symbols" in order to eventually assume this responsibility. During his symbol-learning program, his instructor, parents/parent-substitute and many trained "listeners" share this responsibility with him, but gradual growth to independence in this area should be one of the major objectives of the instructional program, whichever model is being used.

In orienting the student to different listeners, he should be made aware of two styles of communication:

One to be used if the listener does not know symbols and relies on the words appearing under the symbols on the display;

The other to be used if the listener is knowledgeable about the symbol system or is interested in becoming knowledgeable.

In the first instance, the student will rely heavily on direct symbol-to-word translation and the communication will be comparable to pidgeon English or word-to-word foreign language translation. In the second instance, the student can explore strategies, combine new symbols and creatively utilize the system's capabilities.

A note of caution is introduced here for those becoming involved in instruction for the first time. Make a distinction between instruction and communication! Plan time for instruction: the development of skills and reinforcement of learnings. Also, plan time for conversation during which no "correcting" occurs and there is no introduction of new skills; but which is, rather, an enjoyable exchange of information: "a good talk!".

In all planning with regard to the development of communication skill, the instructor should always recognize the collective limited knowledge with reference to Blissymbolics and be ready to learn from the insights and discoveries of the symbol user.

Pre-requisites to Successful Communication

1. The student needs to be properly seated and have adequate equipment (see Appendix 4) in order to indicate symbols effectively with the least expenditure of energy, in the smallest amount of time.
2. A functional vocabulary needs to be available to the student (see Vocabularies section, p. 160). This involves having the display translated if the language spoken at home is different from that spoken at school.
3. Specific instructions to the "listener" need to accompany the student's symbol display (see Appendix 9).

4. The "listener" needs to be aware of the general guides to successful communication with non-speaking persons. The listener must recognize, however, that previous skills which facilitated communication with a non-speaking person (Bigge, 1977) need to be re-examined; symbol communication makes possible the shift of responsibility from the "listener" to the symbol user and requires some new skills on the part of the "listener". Some of the guides are relevant to communicating with both the symbol user and the non-symbol user:
 - (a) Establishing clear and reliable "yes" and "no" signals;
 - (b) Learning what other signals the person uses;
 - (c) Providing opportunity for initiative in communication;
 - (d) Asking questions one at a time;
 - (e) Accepting only clear responses;
 - (f) Allowing time for thinking and the expressing of ideas;
 - (g) Talking "at a level with" but never "down to";
 - (h) Continuing the conversation until the expressed ideas, feelings or attitudes are clarified;
 - (i) Avoid guessing; clarify with a request for a "yes/no" response whenever unsure of a point;
 - (j) Be in a comfortable position with reference to the student.

With special reference to the symbol user, the following additional guides are helpful:

1. Writing the symbol message, as given by the symbol user; this provides both the "speaker" and the "listener" with an interpretation aid; they can concentrate on the context and content of the message, using the cues available from sequenced visual information to interpret the total meaning;
2. Re-phrasing a question often helps when the student has been unable to respond;

3. Being sensitive to the symbol vocabulary known to the child and structuring questions to facilitate ease of response;
4. Becoming aware of the capabilities of the system;
5. Assisting the symbol user when his message is not clear by suggesting:
 - use of the strategies;
 - sequencing according to the Blissymbolics model (see Syntax section, p. 32);
 - saying it another way;
6. Being aware of one's own needs with regard to the symbol system and being able to articulate them.

Tips for Listener

1. Smile.
2. Read label on tray.
3. Ask one question at a time.
Wait for a reply.
4. If you allow for choices, give one at a time.
5. Avoid double negatives.
6. If you don't get a response, don't start guessing right away.

First ask.....

"Did you understand my question?"
(If not - ask it another way)

"Is there a symbol on your board
that answers my question?"

If you still don't get a response,
ask -

"Would you rather talk another time?"

7. If there is a response, but you cannot understand unscramble message by simple "?".

- Who	- Action	- What
(noun)	(verb)	(object)

KEY

WHO is it about?

What did the person DO?

WHAT did they do it to?

"Can you say it another way?"

"Do you want to continue to try to get the message across?"

"Let's try again tomorrow."

8. If you are very busy and time is limited, try to ascertain the main idea; come back for more at a later time.

Examples of Listener Responses

Try to match your response level with the needs of the child considering such factors as: extent of handicap, level of function, speech, learning potential, developmental level, hearing and visual acuity, level of language comprehension, desire to interact with others, degree of home acceptance of symbols. Avoid placing the child in a situation where your response level may be too difficult.

Sample Communication Levels

- | | | | |
|-----|-----------------|---|--|
| (a) | Student's level | - | At introductory stage uses separate symbol cards. |
| | Response | - | Each time child uses a symbol, say the word, point to the symbol, write the symbol (whenever possible). |
| (b) | Student's level | - | Indicates short sentences. |
| | Response | - | Repeat the meaning of each symbol as child points to it. Expand the given message to make an English sentence. Ask for information through "yes" or "no" questions or through more symbol output to expand sentence further. |
| (c) | Student's level | - | Uses short sentences -- brief and clear.

Good knowledge of individual symbols. |
| | Response | - | Wait for entire sentence and then verbalize.

Wait for the child to confirm that you have received the correct message. |

If not correct, ask "which symbol did I interpret incorrectly?"

- (d) Student's level - Indicates longer, clearer sentences.
Good knowledge of symbol display.
- Response - Wait for phrase units and then verbalize.
Arrive at expanded sentence form by using context and syntax clues.
If the message is being interpreted incorrectly, ask the child to explain what is wrong in the message received and to correct it.
- (e) Student's level - Indicates longer sentences -- often confusing and rambling.
Needs verbal reinforcement to keep on topic and guidance to arrive at good sentence structure.
- Response - Guide output through specific questions -- who, when, where, why, how.
Repeat the meaning of each symbol and symbol phrase.
Help the child distinguish between those symbols required and those not.
Emphasize meaning content of message.
- (f) Student's level - Uses long, easily interpreted sentences -- clear and mature use of system.
Good understanding of individual symbols and display; well organized statement.
Good use of symbol strategies.
- Response - Refrain from any verbalization of child's output.
Proceed to a reply.

(d) Expanding Cognitive - Perceptual Awareness:

As the student progresses in the symbol system, he uses more strategies and more abstract and combined symbols, providing many opportunities for cognitive growth. Through exploring the composition of the symbol, the logic and inter-relationships of the symbol parts can be explained to the student and he can be encouraged to use the system creatively. As he becomes interested in the more complex ideas represented by symbols, it is important that he understand that each symbol's composition represents one way of expressing a concept, not the only way. In order for the system of Blissymbolics to be functional as a communication medium, each user agrees to use the standard form of the symbol as originally devised by C.K. Bliss and as now authorized by the Blissymbolics Communication Foundation. This should not mean to the student that the symbol representation is directly equivalent to the concept. Discussion regarding the different possible representations of the concept can help the student appreciate the genius of C.K. Bliss in having arrived at so many succinct symbols, but it also can create an appreciation for the broadness of any concept and the need to expand one's interpretation beyond the particular definition as represented by the symbol parts.

The research instructors exhibited great interest in the development of activities to further cognitive and perceptual awareness. Worksheets, games, toys, activities (see Appendices 6&7) were designed to utilize symbols for:

- (a) Relating a function with an object;
- (b) Vocabulary building (water, lake, cloud, rain, ice, cry - from water symbol);
- (c) Classification (buildings, people, vehicles, furniture);
- (d) Concepts of colours, shapes, numbers;
- (e) Relational concepts (same as, different);

- (f) Spacial concepts (over, under, between, before);
- (g) Concept of possession (belongs to);
- (h) Concept of time;
- (i) Concept of opposite;
- (j) Observation of fine visual differences (symbols for family members; symbols for child, teenager, adult);
- (k) Classifying entities in varying ways (by function; by substance; by common symbol element often providing another classification e.g. telephone, T.V., radio, language, news, music - all containing ear symbol: communication).

(e) Extending the Academic Curriculum:

Symbols can be utilized at many academic levels. For the pre-school student they provide a medium to be incorporated into toys, stories, games, music, circle time, art activities. For the kindergarten student, they offer an interesting focus for themes; e.g. family, weather, clothing, special holidays, feelings, transportation, seasons, nature study, etc. For the primary student, symbols can be incorporated into the study of such topics as calendar, time, money, and the general subject areas of geography, mathematics, science, health and reading. Semantography contains many series of symbols just awaiting their utilization by the innovative instructor.

In the area of reading and reading readiness Blissymbolics can be used most effectively. Instructors can develop activities in the following areas:

- (a) Sequencing events of a story;
- (b) Sentence completion tasks;
- (c) Yes/no answering of simple comprehension questions from written symbol questions;
- (d) Matching symbol sentence to a picture;

- (e) Finding required sentence part within symbol sentence (e.g. "find verb");
- (f) Adapting worksheets contained in formal reading program;
- (g) Reading symbol stories.

Worksheets for reading readiness are easily prepared because of the simplicity of the shape of the symbols. When Blissymbols are applied beyond the readiness stage, however, consideration needs to be given to the differences between Blissymbolics, a visual system based on meaning; and traditional orthography, a visual system based on a sound letter relationship (see Appendix 10). Blissymbols provide the symbol-user with experience in the process of reading, and allow for the acquisition of a sight vocabulary through the incidental learning of the words which accompany the symbols on the student's display. Blissymbols do not offer a one-to-one symbol-to-word correspondence for direct translation of pre-primers and primers into symbols. If the instructor is utilizing an approach in which reading is taught through moving from word parts to whole words and in which decoding is emphasized, Blissymbols provide little support to the reading program. If, on the other hand, reading is taught via an approach in which there is an emphasis on whole words, whole phrases and the utilization of clues from the context, Blissymbolics provide valuable "reading" experience.

Special Considerations in Programming for the Severely Physically Disabled (severely involved) Potential Symbol-User

In programming for the student whose degree of physical involvement has placed extreme limitations upon his independence and upon his experiences, the sensitivity, patience and resourcefulness of those involved in assessment and instruction are challenged to the maximum. They must be alert to the possibility of a great disparity between the student's physical functioning capability and his intellectual

and communication potential. If this discrepancy does exist, the instructor is faced with the task (1) of demonstrating it objectively in order to justify an instructional program and (2) of developing a program to meet the student's intellectual and communication needs in spite of the difficulties presented by his physical limitations.

Assessment recommendations based on initial assessment procedures are usually offered very tentatively. The instructor, in many instances, will have to decide upon the most suitable model for initial programming, utilizing primarily subjective and intuitive evaluations of the student's learning capabilities. She must then rely extensively upon an ongoing diagnostic instructional program to provide her with sufficient knowledge of the student's capabilities and learning style in order to evaluate the appropriateness and usefulness of the initial model selected, or, indeed, of symbol communication itself for this student.

Several factors which were identified within the Evaluation Study as being closely related with SYMSKILL (see Appendix 2, Evaluation Study), and which have been discussed in Factors Affecting Blissymbol Communication, p. 66 (Evaluation Study) can be particularly useful indicators as to the relevance of the instructional program for the severely disabled student.

- *Interest in communication*
- *Child's frustration*
- *Attitude to learning new symbols*
- *Alertness*
- *Interest in creating new symbols*
- *Speed of learning symbols*
- *Highest visual level*
- *Ability to deal with listener's misunderstanding*

In beginning an instructional program, it may be necessary initially to direct attention toward the student

developing an awareness of the value for him of communication. If his needs have always been anticipated by well-meaning and sensitive parents and teachers, the student may see no need to expend effort to learn a way of communicating with symbols.

As with the young child, the absence of a consistent "yes/no" response cannot be taken as a reliable indicator of the student's limited potential for communicating effectively with symbols. The extreme physical difficulty of consistently signalling an interpretable "yes/no" and the possibility that the severely disabled person may not have been given sufficient opportunity to use or learn this capability, may make it necessary for the instructor to also include within the instructional program, the learning of recognizable "yes/no" responses and the making of choices.

With regard to the tempo and style of the program for the severely disabled student, the following section* from the Teaching Guideline, O.C.C.C., 1974 (re-printed, B.C.F., 1975) is included:

With the highly involved child, symbol education moves at a pace directly geared to the youngster's rate (speed) of symbol output. In the 1973-74 symbol class, I have planned all learning experiences with this in mind:

Severely involved children talking on boards containing 200 symbols do so slowly. Not always, in fact rarely, do they use sentence structure in the course of natural give-take conversation. With these two facts as points of departure it is possible to organize a class routine which will bring symbol communication into constant play.

Each day the children begin work with a warm-up period; they work one to one with a volunteer who records their statements (symbol output). For highly involved children 45 minutes might result in 2, 3 or 4 lines of 4 symbols each. It is the volunteer's job to question, to probe, to ask for categories, adjectives (describers) go-green verbs etc. all to help reconstruct on paper (where the child can see it) the child's idea. A skilled volunteer does not

*Contributed by Judie Barlow, O.C.C.C., Toronto.

add to the output, but helps the child locate the most efficient and effective strategy to convey his meaning (usually through penetrating questioning). Consequently it becomes extremely important to invest time in the training of volunteers. In order to know specifically where the child is at in the program, you (the teacher) must have accurate reporting of the child's ever-changing output. For this reason anyone working on a one-to-one basis with the child must know the various techniques, styles, clues, hints, classifications and pre-determined patterns of English-symbol output being striven for. (See Symbol Strategies, p. 13).

After 45 minutes of such semi-private conversation, our group comes together and we share whatever it is each child wishes us to hear (from his earlier time with one volunteer). It is a refining process, for the second output often allows the child an opportunity to alter, elaborate upon and embellish his news. He must also defend it against questions from his peers. As co-ordinator of this group session the teacher is in the position of calling upon others to put demands upon the speaker. She can ask for more symbols, for fuller sentences, and for richer description. She can guide the group in such a way that the other children are putting their minds and symbol boards to work in a joint effort - to accurately "read" the first child's news. In this way cross-conversations emerge. With students, such a period could last an hour; it seems more productive if limited to 30-40 minutes, thereby enforcing a speed of sorts, with the emphasis on efficient symbol usage to make known a specific meaning.

Three major considerations are required in programing for the severely disabled student:

1. Allowance should be made for considerable time to be allocated to each stage of the program; regardless of the student's learning capacity, extra time is required for interacting with the severely disabled person.
2. The student should be prepared to use more than one type of symbol communication. If the assistance of a technical aid is anticipated, the therapy and rehabilitation engineering resources available to the student should be investigated. The instructor should also explore and become familiar with the range of

communication technical aids being developed internationally. Never, however, should symbol communication instruction be withheld while waiting for the appropriate technical aid. The student should always be provided with an interim and alternative means of accessing the symbols, to be used whenever technical aid is not available to him (see Appendix 4).

3. The instructor must work with the student toward the development of strategies and semantic grammatical rules which facilitate effective communication with a limited number of symbols. The syntax model outlined in the syntax section is directed primarily toward the symbol-user who can readily point directly to symbols, and can serve only as a reference.

From the research findings (see Data Analysis section, Evaluation Study, p. 32) Disability was found to have an effect upon *Integration of symbol communication*, the degree to which symbols are integrated into a person's total communication with others. Generally, the results indicated that the moderately handicapped person used symbols most extensively; the severely handicapped person was next in degree of symbol integration; the least physically handicapped person demonstrated the smallest degree of symbol integration. These results are not surprising, given the ease with which symbols can accompany and be used by the moderately handicapped person confined to a wheelchair. When more sophisticated displays are required - either as technical aids for the severely handicapped or as portable, non-restricting displays for the active mobile person - integration of symbol communication into the person's total communication becomes much more difficult. The same pattern appeared with regard to *Number of settings* in which a person used symbols to communicate and with performance level in SYMSKILL.

Although the Evaluation Study results suggest, at the present time, a more limited symbol communication potential for the severely disabled, the interest and progress being made in the field of communication aid technology offers strong hope for the future. Through electro-mechanical and electronic aids, computer representation of the symbols, improved interfaces and simulated speech, many possibilities exist for improving the symbol communication capabilities of the severely disabled.

Special Considerations in Programming for the Mentally Retarded

Only general suggestions as to programming for the retarded can be made within this publication. As already stated, the focus of the Evaluation Study was the use of Blissymbols by the physically handicapped person; the distinction between retarded and non-retarded was purposefully kept gross (see Appendix 2, Evaluation Study). Nonetheless, areas where special program considerations can be made when instructing the retarded person, can be identified from the quantitative analysis and casuistic information collected.

The study findings confirmed that the intellectual level at which the symbol user functions is a strong determinant of the level at which the symbol system will be used (see Data Analysis section, Evaluation Study). The instructor who plans to introduce Blissymbols to a student who appears to be functioning as retarded, can plan a program within Model 2 or Model 3 after consideration of the following information:

Observed I.Q. demonstrated an effect upon:

1. Performance for the following variables:

- Skill in symbols;
- Number of symbols in best sentence;
- Number of symbols in typical sentence;
- Reading score.

2. The level at which the following variables were rated:

- Integration of symbol communication;
- Attitude to learning new symbols;
- Interest in creating new symbols;
- Speed of learning symbols.

3. Use of:

(a) symbol strategies and symbol indicators, i.e.:

- Proficiency of 'opposite' strategy;
- Proficiency of combining strategy;
- Tense proficiency;
- Exclamation proficiency;
- Proficiency of 'big and little' meaning;
- Indicating part of speech;
- Relativizer proficiency;
- Proficiency of symbol part strategy;
- Other strategies.

(b) non-symbol strategies, i.e.:

- Alphabet-initial consonant;
- Alphabet-endings;
- Spelling;
- Gestures for content;
- Gestures for feeling intensity;
- Eye pointing;
- Facial expression;
- Body movement;
- Other non-symbol strategies.

(c) categories, i.e.:

- Working use of yes, no;
- Working use of manners;
- Working use of questions;
- Working use of people;
- Working use of actions;
- Working use of emotions;
- Working use of descriptive words;
- Number of types of statements.

(See Data Analysis section, Evaluation Study).

The research findings of lower symbol and reading performance levels, slower learning rate and less extensive involvement in Blissymbol communication within the retarded population will offer no major surprises to instructors. The information, however, isolates for consideration specific factors related to the "qualitatively different

use of Blissymbols by the retarded" referred to in instructor interviews, and helps identify areas in which the instructional programming will differ from that for the non-retarded. From the data findings, it is clear that program planning within Models 2 and 3 must include formulation of realistic objectives with regard to:

- (a)¹ Proficiency with symbols;
- (b) *Number of symbols in best sentence;*
- (c) *Number of symbols in typical sentence;*
- (d) Symbol strategies;
- (e) Non-symbol strategies;
- (f) Categories;
- (g) *Types of Statements.*

As well, lower performance expectations must be formulated with regard to reading, speed of learning, and degree of integration of symbols into student's interaction with others. Special attention needs to be directed toward developing positive attitudes toward learning and creating new symbols.

The clarification of these differences can be particularly helpful to the instructor who has students with a wide range of intellectual levels. Through observing a student's performance with regard to these variables, the instructor can more effectively develop individualized programs and more objectively evaluate the appropriateness of the initial assessment and the model selected. From the writer's experience, reference to Model 2 for the retarded student who is placed in a class with higher intellectually functioning students, provides a program compatible with the program derived from Model 1 for the students who learn more readily.

¹ Variable is included in SYMSKILL (see Appendix 2, Evaluation Study).

It is interesting to note that *Observed I.Q.* and *Alertness* showed a significant increase for the study's "retarded" population. This changed perception of the "retarded" student's learning potential was also reflected through the significant increase in the amount of program time allocated to language arts instruction for this group.

Although the study findings do not allow specific program suggestions, they do offer a guide as to the content and objectives for programs for the retarded within Models 2 and 3. Further information relating to programming for the retarded symbol-user can be found in the Symbol Selection section (p. 162) and the Introductory Programs section (p. 149), within Model 2 and Model 3.

Special Consideration in Programming for the Pre-Schooler

The importance of communicating, as broadly as possible at as early an age as possible, can never be too strongly emphasized. The Evaluation Study findings confirmed that change in performance on communication variables was more pronounced for retarded, inexperienced, younger and moderately and severely disabled subjects.

To date, the youngest known symbol student began at age 2; the youngest child included in the Evaluation Study began symbols at age 3.

As discussed in the Assessment section, the student's developmental level, particularly as he relates to visual materials, offers a more relevant indication of his readiness for symbols than does his chronological age. If assessment findings indicate that the child is able to derive meaning from representational visual materials and if symbols are recommended, the child's age becomes important in guiding

decisions relating to selection of model and type of program to be implemented.

In introducing symbols, one important consideration must be the student's experience background. It is imperative that the first symbols relate to known persons, objects and activities. Model 2 provides many suggestions for the older student in regard to symbol program, as does the Vocabulary Selection section (p. 160) and Appendix 6, which lists toys and games which have been found successful.

The Evaluation Study findings demonstrate an increased incorporation of symbols into play materials and pre-school activities, as the instructors become more familiar with the symbol system. The importance of the pre-school instructor having extensive knowledge of Blissymbolics cannot be over emphasized. She must be ready to respond to the young child's fleeting interests and concerns and provide new symbols as readily as new words are given to the young speaking child. Incorporating symbols into each school activity in which the child engages is an important part of programming; however, expanding the child's expressive symbol vocabulary as rapidly as the child can learn it and providing a model from which the child can produce symbol utterances, are the real challenges.

Instructors with classes containing both speaking and non-speaking students might wish also to make use of symbols to assist their speaking children in the development of pre-school skills. Selecting a symbol from a group of symbols (shape discrimination), developing a concept of colour, increasing the complexity of pictures which can be comprehended are three variables which showed positive change as students worked with symbols (see Data Analysis section, Evaluation Study, pp. 19-36). Many other benefits for the speaking

child can be discovered by the innovative teacher. Providing symbols for all the children in the pre-school group, whether speakers or symbol communicators, will lend strong support to the symbol student's progress. Instructors within the study who presented symbols to their entire group were enthusiastic about the positive results for everyone.

(f) Ongoing Evaluation of Progress:

The findings of the Evaluation Study indicated that a number of variables relating to symbol communication performance showed a change which can be related to the symbol instructional program (see Data Analysis section, Evaluation Study) and/or have been shown to relate closely to SYMSKILL. The recording materials which follow provide a preliminary format by which the instructor can evaluate progress through objectively observing the student with regard to these variables. Many of these variables have also been identified in the comparison made between groups with HI SYMSKILL scores December 1974 and groups with LO SYMSKILL scores December 1974 (see Research Data section, Evaluation Study, p. 66). They have been divided into those relating primarily to COMSKILL (skill in symbol communication), those relating mainly to SYMSKILL (skill with symbol system) and those secondary factors which can be objectively observed.

The recording materials are based primarily on the Progress Report recording materials developed as part of the Evaluation Study. As in the Assessment section, the recording materials which are new or amended will be denoted by (R) . These will appear as an Ongoing Evaluation Form to accompany the Initial Assessment Recording Form and will be available from the Blissymbolics Communication Foundation.

Instructors who participated in the Evaluation Study found the research recording materials useful in directing their attention to the many aspects of symbol communication, in providing a framework for observing performance and program planning, and in providing information for writing reports. In an examination of individual sections

of the materials, 86 per cent of the instructors evaluated the Communication recording materials as "very relevant" to their program needs.

Forty per cent of the instructors felt that the materials were appropriate for recording progress every six months rather than every three months as has been required during the Evaluation Study. The time interval selected (and also the appropriateness of the recording materials) will vary with the model being utilized.

Many other materials can be developed by the instructor to record information useful in the evaluation of progress. Those included in this section have been selected because they relate to variables which are worthy of consideration with regard to symbol communication progress because of their predictive capability, identified through the data analysis. They relate primarily to Model 1 as this was the model upon which the Evaluation Study focussed.

Variables Relating to COMSKILL

(1) INTEREST IN COMMUNICATION

CHECK the degree of interest the student demonstrates in communication.

0. no interest	
1. little interest	
2. some interest	
3. a great deal of interest	

(2) ATTITUDE TO LEARNING NEW SYMBOLS

CHECK the student's attitude toward learning new symbols.

0. Actively rejects learning new symbols.	
1. No interest in learning new symbols.	
2. Can be directed toward learning new symbols.	
3. Shows interest in learning new symbols presented.	
4. Asks meaning of unknown symbols on display.	
5. Initiates request for learning new symbols.	
6. Initiates and independently directs search for new symbols, e.g. in <u>Semantography</u> .	

(3) INTEGRATION OF SYMBOL COMMUNICATION

CHECK the degree to which symbol communication is integrated into the student's way of relating with his world.

0. Symbols can be identified but are never used in student's expressive communication.	
1. Student uses symbols to respond to questions which are directed toward a symbol response.	
2. Student spontaneously responds with symbols; does not initiate symbol communication.	
3. Beginning to initiate symbol communication and to view symbols as a means of communication.	
4. Symbols form an integral part of student's communication but limited to specific persons and specific situations.	
5. Symbols form an integral part of student's total communication at all times when the situation is structured for this to occur.	
6. Student directs all situations so that symbols form an integral part of his total communication at all times.	

(4) ABILITY TO DEAL WITH LISTENER'S MISUNDERSTANDING

CHECK student's ability to deal with situations when the meaning of his message is not comprehended by the listener.

0. No attempt to deal with situation.	
1. Repeats first message.	
2. Gestures or environmental clues accompany first message.	
3. Responds with alternative symbol message when directed by specific questions.	
4. Responds with alternative symbol message when reminded.	
5. Independently produces alternative symbol message with effort.	
6. Spontaneously offers alternative symbol message.	

(R)

(5) NATURE OF SOCIAL INTERACTION

RANK Most (1) to Least (5) the people with whom the child interacts.
RATE type of interaction using key below.

Rank Order		How student interacts
	familiar adults	
	unfamiliar adults	
	speaking peers	
	non-speaking peers	
	younger children	

KEY

- (a) attention-seeking behaviour
- (b) responding to interaction
- (c) initiating interaction

(6) NUMBER OF SETTINGS

CHECK all the settings where the student uses symbols to communicate.

classroom	
other school areas	
home	
club	
religious groups	
family gathering	
shopping	
shows	
friends' homes	
other schools	
social outings	
others	

Variables Relating to SYMSKILL

(1) NUMBER OF SYMBOLS RELATED TO

CHECK the largest group of symbols from which student can select one symbol upon request.

1 - 5	
6 - 15	
16 - 30	
31 - 50	
51 - 99	
100 display	
200 display partly covered	
200 display	
400 display partly covered	
400 display	

(2) NUMBER OF SYMBOLS, WORKING VOCABULARY, KNOWN VOCABULARY

- (a) RECORD - number of symbols on display.
- (b) MARK - percentage of display known and percentage serving as working vocabulary.

# of Symbols		Percentage										
		10	20	30	40	50	60	70	80	90	100	
	% of display working vocab.											
	% of display known vocab.											

(3) PROFICIENCY WITH SYMBOLS

- (a) CHECK (in column 1) the skill areas which describe the student's level of functioning with symbols.
- (b) RATE (in column 2) proficiency in each of the skill areas checked by points.

	1	2
1. Learning that symbols can be a substitute for speech.		
2. Learning the meaning that is related to each symbol.		
3. Learning that one symbol represents a range of meanings.		
4. Developing speed in locating symbols.		
5. Learning to use symbols for effective and meaningful communication.		
6. Learning to recognize and utilize symbol components.		
7. Learning to create symbols.		
8. Learning to utilize a variety of symbol strategies.		
9. Developing various styles of symbol communication in order to adapt to different listeners.		

PROFICIENCY KEY: 4 - Excellent 3 - Good
 2 - Fair 1 - Poor

(4) NUMBER OF CATEGORIES

CHECK all categories which are part of the student's working vocabulary.

yes, no	
manners	
questions	
people	
actions	
emotions	
description words	
things	

(5) PROFICIENCY WITH SYMBOL STRATEGIES AND INDICATORS

- (a) CHECK (in column 1) the symbol strategies used as part of student's working vocabulary.
- (b) RATE (in column 2) the student's use of each strategy and indicator checked.

Symbol Strategies and Indicators	1	2
Opposite		
"Combine"		
Tense		
Exclamation		
Big and little meaning		
Part of speech indicators		
Relativizer		
Symbol part		
Other:		

KEY: 4 - Excellent 3 - Good
 2 - Fair 1 - Poor

(6) PROFICIENCY WITH NON-SYMBOL STRATEGIES

- (a) CHECK (in column 1) additional "non-symbol" strategies used in conjunction with student's working vocabulary.
- (b) RATE (in column 2) the student's use of each strategy checked using the previous key.

	1	2
Alphabet - initial consonant		
Alphabet - endings		
Spelling		
Gestures* (to supply content)		
Gestures* (for intensity of feeling)		
Eye "pointing"		
Facial expression		
Body movement		
Other		

(7) INTEREST IN CREATING NEW SYMBOLS

CHECK ability to create new symbols.

0. No interest in creating symbols.	
1. Contributes to creating symbols, but highly dependent.	
2. Attempts to create new symbols, but needs assistance to complete.	
3. Independently completes new symbols; poor quality.	
4. Independently completes new symbols; requires minimal assistance for symbol to be acceptable.	
5. Independently creates *acceptable symbols.	
6. Independently creates *exceptional symbols.	

(8) TYPES OF STATEMENTS

CHECK statement types used by student.

Statement	
Negative Statement	
Question	
Negative Question	
Command	
Negative Command	

(9) NUMBER OF SYMBOLS IN BEST SENTENCE,
NUMBER OF SYMBOLS IN TYPICAL SENTENCE

MARK number of symbols in (i) best sentence, and
(ii) typical sentence: indicate exact number of symbols
if more than 10.

Number of Symbols	1	2	3	4	5	6	7	8	9	10	→
In best sentence											
In typical sentence											

Variables Relating to Secondary Considerations
in Evaluating Symbol Communication

(To be considered by instructor in interpreting
COMSKILL and SYMSKILL recordings.)

(1) SYMBOLS AS PRIMARY OR SECONDARY
MEANS OF COMMUNICATION

CHECK objective for symbol communication.

	short-term	long-term
(a) primary means of communication		
(b) secondary means of communication		

(2) ALERTNESS

CHECK the student's general level of alertness
(as often demonstrated by sense of humour).

(a) no interest in surroundings	
(b) little interest in surroundings	
(c) sometimes observant; sometimes see humour in situations	

(3) ASSESSED I.Q.

CHECK the assessed level of intellectual functioning.

(a) severely retarded	
(b) moderately retarded (trainable)	
(c) mildly retarded (educable)	
(d) borderline retarded	
(e) low average (dull-normal)	
(f) average	
(g) high average (bright-normal)	
(h) superior	
(i) very superior	

Name of Test _____

Date of Test _____

(4) THE WAY IN WHICH THE CHILD LEARNS SYMBOLS

(a) very slow learner, continuous drill	
(b) slow learner, some drill	
(c) average learner	
(d) learns quickly	

(5) CHILD'S FRUSTRATION: degree and frequency

(a) CHECK (in column 1) no apparent frustration or the manner in which frustration is manifested.

(b) RATE (in column 2) the degree of the behaviour manifested using the following key:

- (a) very mild
- (b) mild
- (c) moderate
- (d) extreme

(c) RATE (in column 3) the frequency of this behaviour using the following key:

- (a) rarely
- (b) sometimes
- (c) often
- (d) very frequent

	1	2	3
(a) no apparent display of frustration			
(b) aggression			
(c) apathy			
(d) other			

(6) ABILITY TO LEARN THROUGH AUDITORY CHANNEL AND AUDITORY MEMORY

(a) auditory channel	
(b) auditory memory	

(R)

KEY
(a) poor
(b) fair
(c) good
(d) excellent

- (7) CHECK IF THE CHILD HAS A VISUAL PROBLEM WHICH MIGHT IMPEDE LEARNING A VISUAL SYSTEM

YES ☐ NO ☐ Specify _____

- (8) CHILD'S ABILITY TO ATTEND TO VISUAL STIMULI

(a) poor	
(b) fair	
(c) good	
(d) excellent	

- (9) SMALLEST SIZE PICTURE TO WHICH CHILD CAN RELATE

(a) 3" square	
(b) 2" square	
(c) 1" square	
(d) $\frac{1}{2}$ " square	

- (10) SMALLEST DISTANCE BETWEEN STIMULI WHICH CHILD REQUIRES IN ORDER TO SEE THEM

(a) 3"	
(b) 2"	
(c) 1"	
(d) $\frac{1}{2}$ "	
(e) no space	

- (11) ABILITY TO LEARN THROUGH VISUAL CHANNEL AND VISUAL MEMORY

(a) visual channel	
(b) visual memory	

(R)

KEY

- (a) poor
(b) fair
(c) good
(d) excellent

TOTAL

(g) Deciding whether or not to
Continue Symbol Instruction:

Before concluding this section, attention must be given to one question asked frequently by new instructors:

What period of time should be devoted to initial training before deciding whether or not symbol usage is a realistic goal for this student?

It is evident that no general answer can be given, but more specific questions can be formulated which should assist the instructor in arriving at a decision.

1. Was the appropriate model used?
2. Was the instructional program adequate?
3. Was sufficient support given to the student - i.e. seating; equipment; acceptance of system and newly emerging abilities and needs by meaningful others; time devoted to "communicating"?
4. Has the time spent been realistic for this student?
5. Was change negligible or non-existent in SYMSKILL and COMSKILL (see Ongoing Evaluation section)?
6. Has the program been able to meet the child's special needs as identified through the Ongoing Evaluation section, p. 191?
7. Has consideration been given to the question of the suitability of symbols? (See Factors Affecting..., Evaluation Study, p. 66, in which the opinions of research instructors regarding the suitability of symbols (1974 and 1975) are summarized and the factors accompanying regression in SYMSKILL are discussed.)
8. Has attention been given to those variables which are predictors of SYMSKILL? (See Factors Affecting..., p. 66, Evaluation Study, in which variables are summarized, for which a difference in performance between HI and LO SYMSKILL achievers can be expected.)

If the answer is "no" to any of the questions, and if intervention in response to the problem area is possible, continuation of the instructional program with re-defined objectives, would appear justified.

If the answer is "yes" to all the questions and if symbol usage for this student appears ineffective, discontinuation of the instructional program would appear indicated. Depending on the circumstances, provision might be made for a re-assessment in order to re-examine the appropriateness of any, alternative to speech, to select another augmentative mode of communication, or to consider symbol instruction at a later time.

If, as is usually the case, some of the questions are answered by "yes" and some by "no", the instructor should examine the problem areas identified through the above-mentioned program evaluation procedure, consult with the parent/parent-substitute and appropriate professionals, and try to arrive at the most informed decision possible.

2. THE SYMBOL PROGRAM AS IT EXTENDS BEYOND THE SYMBOL-USER

Although the recording materials used in the Evaluation Study focused primarily on the individual student's performance, data was also collected with reference to the effect (upon progress in communication) of the classroom program, the educational setting, the residential setting and the community within which the symbol-user interacts. The need to look beyond the individual's instructional program is reinforced by an examination of the reasons cited by instructors as to why some children should not have been started on symbol programs and the variables accompanying regression in SYMSKILL scores (see Factors Affecting..., Evaluation Study). Along with many factors relating to the individual's capabilities and needs, the following program factors frequently accompanying lower performance scores, were noted:

- (a) the only child in the setting;
- (b) change in instructor and/or residence;
- (c) requires electronic equipment and/or seating;
- (d) no regular instructional program in chronic care setting;
- (e) institutional residence;
- (f) student is bilingual; second language not available on symbol display for symbol communication with family;
- (g) infrequent use of symbols at home due to:
 - (i) lack of acceptance;
 - (ii) speech better understood than symbols;
 - (iii) child refuses to use symbols;
- (h) lack of family support and co-operation.

That factors other than the student's capabilities can detrimentally affect his progress is self-evident. With symbol communication, the influence of these other factors can determine the initiation and/or continuation of programs. It was felt important, therefore, to summarize the needs and the effects of symbol usage to all program levels. The following sections summarize information obtained from the Evaluation Study instructors relating to factors they deemed important at levels beyond the individual's instructional program.

CLASS PROGRAM AND INSTRUCTIONAL ENVIRONMENT:

At the beginning of the Evaluation Study, instructors recorded the following changes resulting from symbol involvement:

<u>Change</u>	<u>Percentage of Programs</u> ¹
Extra personnel obtained	36%
Extra instructional aids and materials utilized	70%
Additional special resources	51%
Additional time spent in instructional preparation	80%
Additional demands made upon the instructor	92%
An increase in instructor's facility to programme in other areas	54%

Extra Personnel Obtained:

In most cases this involved volunteers and parent volunteers working as teacher-aides, relating with the students and preparing symbol materials. Other additional personnel resulted from increased speech pathology, occupational therapy, and physio-therapy involvement with the symbol students.

Extra Instructional Aids and Materials Utilized:

Teaching aids in the form of games, toys, stencils, books, seatwork, bulletin boards and audio-visual materials were produced, frequently with volunteer help. Students from other classes in the school were enlisted to help develop materials. In other situations the assistance of an occupational therapist and workshop resources available within the instructional setting and the community were utilized. The importance of symbols being integrated into the play materials of the young child and the need for materials (such as books and games) to encourage family symbol involvement were emphasized (see Appendix 6).

¹Individual instructional programs within total symbol using population.

Additional Special Resources:

Instructors cited the following changes which served to strengthen their programs:

- (a) Opportunities to attend symbol workshops and professional training programs;
- (b) Other teachers becoming interested in Blissymbolics and sharing in the learning of the system;
- (c) Intellectual assessment becoming possible for the first time for some symbol students;
- (d) Community interest facilitating the involvement of volunteers;
- (e) Attention being directed toward symbol students by rehabilitation engineers;
- (f) Favourable publicity for the setting in which the symbol program was taking place;
- (g) Increased consultant services from the community;
- (h) Increased contact with community agencies;
- (i) Additional secretarial services.

Additional Time Spent in Instructional Preparation:

Such comments as:

"Lots!"

"Double!"

"Need more!"

"Demands overwhelming!"

were repeated throughout the interviews.

The reasons given were:

- (a) the need for individualizing;
- (b) the newness of the use of Blissymbolics and the "need to ponder";
- (c) the lack of published materials;
- (d) the difficulties of programming for a Bliss student when the instructor already has a full schedule relating to non-Bliss students;
- (e) the desire to plan tasks related to evaluating communication and cognitive skills.

In addition to the preparation of instructional materials, a most time-consuming activity was the development of alternative displays to arrive at the best method of indicating symbols for those children having problems. Many instructors also reported that extensive time was required for the development of materials for parent programs and for community orientation.

Additional Demands:

For many instructors, symbol involvement meant more meetings, more paperwork, more problems, and many new responsibilities. Their roles expanded to include one or more of the following:

- (a) In-service presentations to staff, volunteers, students;
- (b) Training of volunteers;
- (c) Instructional programs for parents;
- (d) Relating to many visitors;
- (e) Public relations responsibilities:
 - (i) talks in the community;
 - (ii) radio, T.V., newspaper interviews;
 - (iii) producing videotapes;
- (f) Study of Blissymbolics and other augmentative communication systems;
- (g) Applying for funding for development of the symbol program;
- (h) Seeking assistance in the community for the construction of displays and interfaces;
- (i) Involvement in an objective evaluation of the effectiveness and appropriateness of symbol communication for their students;
- (j) Greater involvement in team programming and in interacting with parents;
- (k) Increased organizational responsibilities as role became more diversified.

An Increase in Instructor's Facility
to Program in Other Areas:

Instructors reported an increased confidence and greater ability to work with the students as their ability to communicate improved. Symbol communication enabled the student to socialize more and to take greater responsibility for behaviour, academic performance and decision making; it allowed him to interact more with others and be more independent in the classroom situation. Blissymbols were used specifically in reading, vocabulary study, mathematics, science lessons and social studies; they were described generally as providing stimulation to academic areas. Socialization and working together was facilitated both within the classroom and with other classes in the school. Integration of the student into other classrooms for certain subjects became possible. The interest shown, particularly by older students, led, in some instances, to their active involvement in the symbol user's program.

Instructors recorded the following changes in their total program as the students progressed in their knowledge of symbols:

- (a) Procedures were more oriented toward abstract concept teaching;
- (b) Fewer rote activities and drill procedures;
- (c) Increase in game-oriented activities;
- (d) Students assumed greater responsibility in problem-solving;
- (e) Procedures involved lessened focus on perceptual training;
- (f) Greater flexibility in programming;
- (g) More group oriented programming;
- (h) Increase in independent activities;
- (i) Greater sharing of symbols with speaking students.

Although many positive changes occurred as a result of symbol communication, the introduction of a new program and the additional demands involved, created difficulties. Time, space, personnel, materials, attitudes, supportive services, finances were cited frequently as areas in which problems can arise.

Time is needed for: planning, preparing instructional materials, interacting with the severely disabled person, studying Blissymbolics, providing suitable displays, interacting with other professionals, orienting others, public relations, evaluation, organizing the many program facets, visitors, training helpers, relating with parents.

Space is needed for: extra equipment, additional helpers, visitors, increased opportunities for socialization and independence.

Personnel are needed to: provide the individual instruction essential to early stages of symbol instruction, provide supportive services, help in developing materials, assist the instructor with increased workload.

Materials, which are commercially available (see Appendix 8), are needed to reduce the instructor's preparation and one-to-one teaching time.

Attitudes must be positive if the symbol program is to succeed. Instructors need to be enthusiastic, creative, and positive about the future application of Blissymbolics. Other professionals in the setting need to be willing to try something new. The student must accept his symbol communication and his newly developing needs and skills;

speaking peers need a positive accepting model on the part of adults from which to pattern their responses to the symbol-user; instructors require a sensitivity to the possible resentment by speaking students because of the time and attention required by symbol-users. Staff and administrators throughout the setting need to support and value the symbol program.

Supportive Services are required from many professional areas, as well as from the Blissymbolics Communication Foundation to provide:

- (a) Adequate service relating to assessment, positioning and accessing of symbols;
- (b) Symbol displays and technical aids;
- (c) Instructional information and materials;
- (d) Information regarding Blissymbolics and its application.

Finances are need to develop a program in which the elements listed above are adequately dealt with.

The problems of individual symbol instructors were many and varied. Primarily, however, they related to situations arising from the introduction of something new and to the pioneering work necessary in such undertakings. Frequently the problems were compounded because the decision to begin a symbol program had been made independently by the instructor and had limited administrative support. It is hoped that with the growing awareness of the effectiveness of Blissymbolics and the increased appreciation of program needs, many of the problems faced by the early symbol instructors will be reduced for future instructors. Administrative involvement prior to the initiation of symbol instruction could deal with the potential problem areas before the program begins and hopefully provide the instructor with the support needed.

It was observed by the research investigators that most of the instructors who participated in the Evaluation Study were innovative, independent, strongly motivated professionals, sometimes working almost alone in establishing a symbol program. It is hoped that, in the initiation of future programs, sufficient support will be given such that the extensive extra effort required of the research instructors will not be a necessity for a program to succeed. Provisions should be made to ensure that the program can continue beyond an individual instructor's period of involvement.

THE EDUCATIONAL SETTING:

The extent to which the symbol user interacts within the larger educational settings and the attitudes of those with whom he relates can have an important effect upon his progress. In this regard, instructors mentioned:

- (a) There is more growth in symbol usage when a large number of adults give feedback;
- (b) It is important that the student not associate symbols with only one part of the educational setting;
- (c) The student grows in self-esteem and confidence when he sees symbols being used throughout the setting.

The ideal instructional program would seem to involve an all-symbol class for the student's initial intensive symbol instructional program, in order to provide a consistent model as well as sufficient time for one-to-one instruction. This stage would be followed by the student's advancement to an integrated situation in which he interacts with many speaking students and adults (see Appendix 9). Prior to providing a completely integrated situation for the symbol user, many instructors arranged for interaction between the class containing symbol children and classes in which there are no symbol children. In information from 19

settings at the end of the Evaluation Study the degree of interaction was reported as high or moderate for 75 per cent of the settings.

Instructors cited several difficulties encountered with regard to symbol usage in the larger setting:

- (a) Resistance by some professionals in accepting symbols as the child's primary communication system;
- (b) Other teachers questioning the selection of particular students for symbol instruction;
- (c) Resentment on the part of other teachers because of the attention given to new symbol programs;
- (d) Staff feeling threatened by the new system and being unable to communicate comfortably with the symbol user;
- (e) Frequent misplacing of the symbol display and lack of regard for its importance to the user.

Instructors, for the main part, felt they had a responsibility for staff orientation toward the use of Blissymbolics. Their objectives included:

- (a) Reducing "fear of the unknown" felt by many of their colleagues;
- (b) Providing a better understanding of the importance of an expressive communication system and the role to be played by augmentative systems to speech;
- (c) Explaining why Blissymbolics was selected;
- (d) Understanding the logic and structure of the system;
- (e) Developing an appreciation in others of how Blissymbolics differed from speech therapy, reading and other communication and symbol systems;
- (f) Keeping informed of research data relating to the effect of symbol usage upon speech (the current study indicates that there is no detrimental effect upon speech resulting from symbol usage - see Speech and Language section, p. 80, Evaluation Study);

- (g) Providing information as to how to relate comfortably with symbol users;
- (h) Developing in others realistic expectations with regard to a student's progress;
- (i) Fostering interest and support on the part of all staff;
- (j) Developing in others an awareness of the cost comparison between educating a student without any means of communication and educating a student who becomes semi-independent through being able to communicate.

As well as giving staff orientation presentations, instructors disseminated information about Blissymbolics through:

- Bulletin board displays;
- In-house newsletters;
- Special art projects;
- Inviting staff and other students to special class activities;
- Bazaars;
- Symbol labelling the entire setting;
- Showing Mr. Symbol Man and videotapes;
- Having symbol students participate in school concerts;
- Placing information as to the capabilities of the Blissymbolics System on the students' symbol displays;
- Scheduling special "information" days;
- In-service for upper grades.

Instructors looked for assistance from the rest of the setting through:

- (a) Administrative support for an appropriate number of students within a class, a flexible timetable to accommodate extended role and training opportunities;
- (b) Encouragement and interest on the part of colleagues;
- (c) Therapy assistance;

- (d) Provision of adaptive equipment and technical servicing to maintain equipment in working order;
- (e) Financing for equipment and displays;
- (f) Availability of audio visual aids;
- (g) Provision for team involvement;
- (h) Involvement of a social worker, reading consultant, psychologist as needed.

FAMILY INVOLVEMENT:

The importance of family acceptance of symbol communication was stressed by symbol instructors. They recognized that family support varied greatly from student to student and various approaches and techniques were used to encourage as much involvement as possible. The Family section in the Evaluation Study presents information obtained through a parent questionnaire distributed midway through the Evaluation Study and gives some indication as to the degree of success obtained by the instructors in including parents in the symbol communication program. Two further factors which may interfere with the development of a high degree of family involvement are the heavy work demands placed upon the instructor and in some cases the instructor's lack of confidence in her ability to present the system to the family. As instructors grow in their knowledge of the system, through learning with their students, they become more positive toward including the parents. In those instances where instructors did include parent involvement as part of their initial program, they were enthusiastic about the results.

Just as important as teaching the parents about the system of Blissymbolics, is the need for counselling the parents with regard to their new relationship with their symbol youngster. Parents need to be sensitive to the symbol user's potential to be more independent, to be more skilful with symbols than any other member of the family,

to make decisions, to take a more active and dominant role in the family and community. Helping the parents alter attitudes and behaviour patterns which may have reinforced the youngsters dependency upon them may be one of the most challenging aspects of the symbol communication program, and should not be overlooked.

The following ideas were suggested by instructors as ways of stimulating parent involvement:

- (a) Have parents visit instructional setting for a day;
- (b) Prepare daily notebooks/"Family-grams" (3-part ditto of goals - method - progress report, which goes home for parents; report on "homework", which is returned by them; reinforcement through follow-up assignments);
- (c) Holding periodic conferences/workshops with parents and involved disciplines;
- (d) Arranging for parent to meet other parents of non-verbal children (socially);
- (e) Tape child's speech and replay to parent to demonstrate that not everyone understands the speech;
- (f) Use "parent volunteers";
- (g) Establish and maintain phone contact between teacher and parent;
- (h) Make provisions for ethnic translations;
- (i) Send symbol games home, e.g. symbol bingo, scrabble, dominoes, etc.
- (j) Send taped message home and the child must show this message to parents, using board;
- (k) Take immediate action on parental requests for symbols;
- (l) Make home visits.

For those symbol students living in institutions and residential settings, the problems of program follow-through with substitute parents and care staff were enormous. Many of the approaches suggested with regard to staff orientation in the educational setting (p. 214) were tried, but shift work, staff turnover, loss and damaging of

displays and lack of time presented serious obstacles. Some instructors found symbol communication on the wards easier than signing (which was being introduced in many settings); new symbols could be recorded and reviewed and the student's known vocabulary was readily visible for the ward staff to learn and use. However, many instructors became discouraged at the immensity of their task. Regular, ongoing symbol orientation for staff would seem to be one area needing development, along with increased administrative attention to special support services for residents requiring communication instruction.

COMMUNITY AWARENESS OF BLISSYMBOLICS:

Recognizing that learning a new means of communication involves a widening of one's world, instructors planned ways for symbol-users to interact within the broader community and for the community to come to the symbol user. Shopping excursions, trips to neighbouring schools, and special outings were arranged and were enriched through the additional dimension of symbol communication (see Appendix 9).

Instructors also initiated and responded to community interest through:

- (a) Newspaper, radio, television interviews;
- (b) Giving talks to service clubs, women's groups, church groups, university students;
- (c) Acquainting educational consultants and administrators of the need for integrated educational settings and community facilities for symbol users;
- (d) Accepting numerous visitors and volunteers, both adult and student;
- (e) Seeking funding assistance;
- (f) Generally contributing to an awareness of the system of Blissymbolics and of the capabilities of the symbol user.

The Evaluation Study, as it related to program, created more questions than it answered - at all levels. It demonstrated, however, that in spite of the limited experience of instructors and the limited program support for the majority of symbol students, Blissymbolics could be an effective means of communication.

Model 1 of this section was based on the ideas and instructional framework of Nancy Lageer, O.C.C.C. Symbol teacher and enriched by the contributions of many other instructors.

Model 2 was based on the suggestions of Evaluation Study instructors and augmented by the experiences of professionals working with the young child who is "at risk" for speech development and by those who view the trainable retarded child from a developmental perspective, such as:

David Yoder

James D. MacDonald and Judith Presser Blott

Patricia Rom

Wm. Ford

Deborah Harris Vanderheiden

Barbara Hall and Lyn Slogan

Model 3 was developed from the comments of Evaluation Study instructors and augmented through the experiences of professionals who have been exploring the utilization of Blissymbolics with the trainable retarded, such as:

June Bigge

Caroline Price

Deborah Tooch

Gregory Hermann

D. Social-Psychological Implications

1. CHANGES IN SOCIAL AND PSYCHOLOGICAL AREAS OF FUNCTIONING

In addition to the changes widely reported regarding the improvements shown by the symbol users in their speech and physical (functional) areas as they developed in their ability to communicate with symbols, other changes have been observed in the social and psychological development of symbol users. The present study did not yield data permitting an analysis which would differentiate those social and psychological changes that would likely accompany an improved ability to communicate by any method, from those changes that appear to be as a result of characteristics specific to symbol communication. One can speculate, nevertheless, that many of the changes reported appear to be a direct consequence of the child experiencing immediate and successful communication, which becomes possible as a result of the ease of learning Blissymbols.

This section will deal generally with social-psychological changes and will not attempt to go beyond the limits of the information available by trying to isolate those changes which would appear to be linked specifically to symbol communication. (Results from the quantitative data analysis regarding social and psychological changes appear in the Research Data section of the Evaluation Study.)

During the first interview of the sub-population instructors, changes in their children's overall motivation and personal growth were already being reported. The changes fell primarily into three areas -- emotional, behavioural and social -- with the greatest number referring to the emotional development of the child.

The kinds of changes reported with regard to the child's emotional development included: that he was happier, more emotionally stable, more independent, less frustrated, more stimulated and motivated; showing more pride in his accomplishments, showing more initiative; better able to accept failure, better able to express his feeling and questions.

Behaviorally, children were reported to be showing less hyperactivity and aggression, greater attentiveness, and reduced behaviour problems.

Socially, the children were reported to be having greater contact with adults and, generally, greater opportunity to socialize.

In many cases the symbol-users were reported to be presenting such an improved image that higher expectations needed to be set as their true potential abilities were revealed.

When these same instructors were asked three months later to report on any further changes, many continued to observe changes which were the same in nature but of greater intensity.

As well as the changes in emotional development already enumerated, comments in these interviews emphasized improved personal adjustment, increased spontaneity and participation, increased maturity and self-confidence, improved self-image. Further, in one situation the child's reaction to communication made evident severe emotional problems, which had previously been overlooked. Through their communication, other symbol-users have also made other, less severe, emotional needs known. There is a deep responsibility upon those introducing an augmentative means of communication to deal with whatever is communicated, including adjustment difficulties. This sometimes necessitates psychiatric or psychological counselling. One must be prepared to recognize and react to these problems.

Increased social interaction was reported with both adults and peers, particularly speaking children. The symbol-users were said to now be part of a peer group. Increased communication with parents was also reported.

With an improved means of communication, personality differences among the children were emerging. The symbol users were demonstrating a sense of humour, creativity and a wide range of varying interests. These characteristics were revealed through both the content and the style of symbol output. In some cases the children were asserting themselves as individuals, demanding more time and attention. Many reported that the image which the child now presented was much different from his image as a non-communicating child. He was now presenting as an active, participating contributing human being.

During the course of the Evaluation Study all instructors were asked to record on an ongoing basis any changes observed in their students which they attributed to a change in communication abilities. Similar kinds of observations were being made for the population as a whole, as were stated by the sub-population interviewed.

The development of social skills was reported with high frequency as interaction with both peers and adults increased. Areas where some degree of change was reported were: the physical area (including speech, hand control, head control, general body relaxation); the educational area (including ability to assess and program for child); family relationships; and behaviour.

The quality and depth of psychological changes are exemplified in the two samples of anecdotal reports which follow.

1. "Becomes very attached to anyone who will take the time to 'talk' to her. Is terribly lonely and depressed otherwise. Is not easy to be with nor is attractive physically so is avoided and ignored much of the time. She feels abandoned by her family (in fact is) and cannot accept this. Is a delightful companion when rapport is established. Bliss has improved her image among caretaking staff and explained much of her frustrated-obstinate behaviour.

"Used her Bliss symbols to attempt to re-establish contact with her family with letter and requests (was unsuccessful but keeps trying). Now talks regularly to chaplain, social worker and teachers about her problems. Still needs more affection and involvement than she gets."

2. "Has become a pleasant, happy young lady who makes it a pleasure to stop and visit with her. She has had two great tragedies since June -- her mother died and her sister was killed in a motorcycle accident. She took the news very hard as anyone would, but now she is able to express her feelings (i.e. she is mad at her sister for going away) and to ask appropriate questions that are important to her (i.e. when told about her sister, she immediately asked about her niece -- whether she was all right). She now realizes that she cannot write to them but wants desperately to contact her only living relatives, an aunt and uncle and her niece.

"Previously we could only guess at her needs and feelings and I doubt that we ever would have understood her desperate need for family ties. No longer is she an unhappy, uncooperative, unpleasant girl to work with but a charming young lady with whom it is a pleasure to visit."

2. INTELLECTUAL ASSESSMENT

CURRENT LEVEL OF FUNCTIONING:

(a) Standardized Assessment:

Serious problems are presented to those attempting to objectively assess the level of intellectual functioning of physically handicapped non-speaking children through the use of standardized assessment devices. A survey of the instruments recorded as being used to assess I.Q. levels (see Table 1) strongly reveals the inadequacies in this area.

Table 1

PSYCHOLOGICAL ASSESSMENT DEVICES - DECEMBER 1974

Test	Frequency of Use
Peabody Picture Vocabulary Test	25
Columbia Test of Mental Maturities	12
Stanford-Binet Test of Intelligence	10
Wechsler Intelligence Scale for Children	6
Cattell Infant Scale	5
Vineland Test of Social Maturity	3
French's Pictorial Test of Intelligence	2
Leiter International	1
Kuhlmann	2
Bayley Infant Scale	1
Haeussermann	1
Gesell	1
Ravens Matric	1
Illinois Test of Psycholinguistic Abilities	1
Total Stated	71
Total Unstated	60
Comprehensive Total	131

Many of the instruments reported in Table 1 are being used inappropriately. For example, neither the Peabody Picture Vocabulary Test nor the Vineland Test of Social Maturity was designed to measure overall level of intellectual functioning, which purportedly is how they have been used.

Many commonly used psychological instruments require either verbal responses and/or considerable motor control.

In response to the pressure to produce formal I.Q. scores, many have used tests in ways resulting in test abuse, rather than accept the inadequacies of currently available test materials. It is believed by the writers that, until a child has an effective means of communication, it is only possible, with existing testing instruments, to assess the child's level of intellectual functioning in a gross way-- i.e. whether he is retarded or not. Without an adequate means of communication, attempts to yield more refined results are generally unreliable. Once a child is effectively communicating (i.e. proficiently using a 400 symbol display including strategies) it then becomes possible to use instruments which require verbal responses, such as the Wechsler Intelligence Scale for Children (WISC), to produce more detailed assessments. To date all the children using 400 symbols at the Ontario Crippled Children's Centre have been assessed on the WISC (verbal section, at least). Results yielded overall levels of intellectual functioning ranging from mildly retarded to high-average, with individual profiles of strength and weaknesses. Generally these results were consistent with the earlier retarded/non-retarded breakdown based on a gross assessment; however, finer distinctions within these two general categories (e.g. moderately or mildly retarded) were not consistent. It would, therefore, seem prudent and fair to defer making other than a gross judgment regarding the level of intellectual functioning of these children, based on existing formal assessment devices.

With this background it is interesting to examine Tables 2-4 dealing with *Observed and Assessed I.Q.'s*.

Table 2

OBSERVED I.Q.

Description	December 1974	
	No. of Children	% of Total
1. Severe	6	4
2. Moderate	30	19
3. Mild	29	19
4. Borderline	26	17
5. Low average	20	13
6. Average	33	21
7. High average	8	5
8. Superior	2	1
Total	154	
Mean	4.07	

Table 3

OBSERVED I.Q.

Description	December 1975	
	No. of Children	% of Total
1. Severe	2	2
2. Moderate	21	19
3. Mild	20	18
4. Borderline	14	13
5. Low average	13	12
6. Average	27	24
7. High average	11	10
8. Superior	3	3
Total	111	
Mean	4.40	

Table 4

ASSESSED I.Q.

Description	December 1974	
	No. of Children	% of Total
1. Severe	20	15
2. Moderate	26	20
3. Mild	36	27
4. Borderline	18	14
5. Low average	11	8
6. Average	16	12
7. High average	4	3
Total	131	
Mean	3.84	

Generally the *Observed I.Q.* is higher than the *Assessed I.Q.* The average *Observed I.Q.* for the entire population in December 1974 was in the borderline range; whereas the mean *Assessed I.Q.* was in the mildly retarded range. In December 1975, while still falling in the borderline range, the mean *Observed I.Q.* was at a slightly higher level than in December 1974. There were too few recordings of *Assessed I.Q.* in December 1975 to make any comparisons. In general the instructors felt their students were functioning at a higher intellectual level than formal assessment results indicated.

(b) Informal assessment

Evaluating the child's use of the *combine* strategy for creating new symbols has already been discussed as a way of assessing the child's skill with the symbol system (see Programming Section, Handbook). This refers to the child's technical use of the strategy.

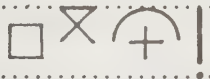
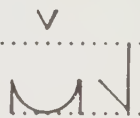
An examination of the content of the child's combined symbols has the potential to provide the basis for assessing the child's cognitive level of functioning. Use of the *combine* strategy requires the child to define his concept of the word for which he wants to create a new symbol.

An attempt was made to analyze the combined symbols submitted during the Evaluation Study on the basis of concreteness/abstractness, specificity/generalization; however, the number of samples from individual children was too small to demonstrate any pattern or trend. In addition, the situations for creating new symbols were not in any way standardized so that in some instances the creation was the product of the child alone; in others it was with assistance.

While it was not possible to use currently available data to arrive any any conclusive recommendations for employing this strategy to assess cognitive functioning, a

comparative analysis of the created symbols of different children for the same word revealed qualitative differences in their output.

For example

marshmallow		 treat	 soft	 food	 colour	
-------------	---	--	---	---	---	---

compared with

	 square	 food	
---	---	---	--

washing machine

	 machine	 wash	 clothing	
---	--	---	--	---

compared with

	 Mother	 has	
---	---	--	---

In each instance, the first example is at a higher, more abstract level and the second more concrete.

Table 5 below also indicates qualitative differences in the way the retarded population creates new symbols as compared with the non-retarded population.

Table 5

USE OF THE COMBINE STRATEGY - DECEMBER 1975

Description	Non-retarded (N-46)	Retarded (N-65)
Excellent/Good	37%	16%
Fair	17%	8%
Poor	13%	11%
Not Used	33%	66%

Approximately twice as many in the non-retarded population are using this strategy as compared with the retarded population. Generally, the quality of use of this strategy is rated at a higher level for the non-retarded population than for the retarded who are using it. The effects of I.Q. on *Interest in creating new symbols* was found to be statistically significant in both December 1974 and December 1975 (see Data Analysis section, Evaluation Study).

All of these findings lend support to the opinion that an analysis of the use of this strategy has potential as an assessment device. The format might resemble the Vocabulary Sub-test of the Wechsler Intelligence Scale for Children (WISC-R) in that the child could be required to "Tell me what.....means" using a combined symbol. The scoring criteria might be modelled after the principles presented in the Vocabulary Sub-test as it stands. (WISC-R Manual, 1974) For example, one criterion for a two-point response is giving a general classification to which the word belongs; whereas a concrete instance of the word is a one-point response.

This becomes an area for further research and development.

EXPECTED INTELLECTUAL CAPACITY:

Current psychometric test results yield at best estimates of an individual's developed capacity. i.e. what he has already learned. Vernon (1969) points out that these estimates are a poor index of genetic intellectual endowments. The type of assessment discussed hitherto refers only to the child's current level of intellectual functioning, and not to the child's potential or capacity.

Reuven Feuerstein (1968, 1970, 1972a, 1972b, Feuerstein, Schlesinger, Shalom and Narrol, 1972) has specified a different approach to assessing and developing cognitive skill among culturally deprived 'retarded performers' which seems to have possible application for assessing the cognitive potential of symbol-users.

Feuerstein maintains, with regard to the disadvantaged child and adolescent, that there is a testing-technology problem because present psychometric devices are not sensitive to the full cognitive capacities of the undeveloped thinker. Similarly, for the population of non-speaking physically handicapped, current psychometric tests have low predictive validity for estimating cognitive potential in

persons whose previous learning experience has been hampered by lack of experience and absence of stimulation.

Feuerstein takes an "active-modificational" approach that employs "dynamic testing". This involves testing in the process of learning by actively assessing changes that might be induced in a learner's problem-solving behaviour. This contrasts with the 'static testing' approach of conventional tests which inventory the existing fund of information. Dynamic testing allows an opportunity to observe the child's method of tackling difficulties, his attention and perseverance in response to a problem-solving situation.

The four major changes required by Feuerstein (1972b) to create a dynamic test from a traditional test approach are summarized below:

1. Changes in the examiner and the test situation:
The tester must become a teacher-trainer who estimates potential educability by sampling the changes in learning rate and style exhibited by a given learner under the best possible instructional and motivational conditions.
2. Changes in test structure:
The structure of the test instruments must be similar to appropriately graduated, well-sequenced educational curricula.
3. Change from a product to a process orientation:
The measurement goal of assessment must be refocused on change in learning process and must de-emphasize the importance of learning products.
4. Changes in interpretation:
The interpretation of test behaviour must allow for emphasizing notable successes, rather than simply calculating an average score.

In order to conduct his 'dynamic testing', Feuerstein has developed radically different assessment tools (the Learning Potential Assessment Device) and remedial materials and strategies (Instrumental Enrichment).

Reports from symbol instructors indicate that, while this has not in any way been standardized or systematized, many are using their symbol instructional programs as 'dynamic testing' situations whereby they glean information which allows them to assess their students' cognitive potential. It seems that many of the principles Feuerstein introduces could be adopted into symbol programs in a systematic way so that standardized information about the process for symbol learning could be utilized to predict the symbol-user's capacity for learning. As discussed in the Informal Assessment section (p. 227) the analysis of the use of the *combine* strategy is viewed as a potential means of assessing the child's current level of cognitive functioning. Perhaps it could also lend itself to Feuerstein's test-train-test sequence in order to yield an index of cognitive modifiability.

This remains another area of further development and systematic research.

V CONCLUSION

The application of Blissymbolics may be considered as having progressed from its infancy to its toddler stage of development. Much has been learned over the past five years regarding the application of Blissymbolics - much still remains to be explored both clinically and through research. Within this Handbook many elementary concepts and ideas have been presented in the hope that they will stimulate further study and dialogue between those involved in the application of Blissymbolics.

There are now many more individuals in schools, institutions and residences who, through Blissymbolics, have a functional means of communication which was hitherto non-existent. Many have revealed capabilities and potentials--intellectual, academic, social --which previously had been undeveloped or unrecognized.

Recognition of new capabilities is, however, only the first step. Those who associate with the Blissymbol-user have a responsibility to provide experience and to obtain services which may be quite different from those which appeared to meet the non-speaking person's needs in the past. Parents, instructors and administrators have an obligation to look again at the needs of these individuals in terms of education, socialization and residential opportunities. Having examined these needs, attempts must be made to meet them. It falls to those who recognize the value of communication with Blissymbolics, to strive toward increasing public awareness of the Blissymbol-user's capabilities and to work toward developing a climate in which any *different* communication system is not only accepted but appreciated for its unique capabilities. Many more individuals could be integrated into their educational and social communities as the public becomes more accepting of those who do not use speech as their primary means of communication. Each successfully integrated Blissymbol-user provides a supportive example for future symbol-users.

Through the Evaluation Study, the effectiveness of Blissymbolics as a communication medium has been demonstrated for a population with a wide age and intellectual range, within many types of settings and using many different teaching approaches. The Blissymbol-user has shown that he can express his own meanings and can interact purposefully with others. Those who associate with Blissymbol-users have recorded the many positive changes which occur as a person becomes skillful in utilizing Blissymbolics as his communication medium. Parents and instructors express the joy of knowing the symbol-user better through Blissymbolics.

Many questions have resulted from the experiences of those teaching, using and responding to Blissymbols. Attention needs to be directed toward the most appropriate applications of Blissymbols, a comprehensive description of the system of Blissymbolics, refinement of procedures for assessment and evaluating progress, development of teaching strategies for particular populations, production of teaching materials and technical aids at both the simple and sophisticated levels, understanding the needs of the "listener", describing the circumstances and social environments in which Blissymbol communication is most successful, and further documenting the effect of Blissymbols upon the users.

Some areas emerge as particularly important for study at this time. Since communication needs to be as functional as possible at as early a stage as possible, high priority needs to be given to information relating to the comprehension of visual information and to expressive communication at all developmental levels.

There is a paucity of documentation as to the application of Blissymbolics with the pre-school child. The way in which visual information is processed by the young child needs to be systematically investigated with a view to the acquisition of Blissymbols. It would be an area worthy of controlled

study to see whether young children need to deal with pictures before they are expected to acquire Blissymbols. What are the perceptual processing requirements for learning Blissymbols and at what stage of development do they occur? What effect does Blissymbol communication have upon perceptual and cognitive processing at different developmental stages? The study of these questions can be extended to the retarded or developmentally delayed child. Many communication and pre reading systems are being used with the retarded population--non-SLIP, Yerkes, signing, word boards, Rebus. A systematic investigation providing a comparison of the abilities required to successfully use each of the systems would be extremely useful in determining for each individual the most appropriate system to use for interpersonal communication.

There is a need as well for documentation of the application of Blissymbolics for populations other than the physically handicapped. There has been interest expressed in attempting to use Blissymbols as a communication means for populations such as the deaf, autistic, stroke patients, aphasic; however, to date there is little known regarding these possibilities. In addition, the use of Blissymbols has been suggested in such areas as the development of reading skills, language and cognitive abilities and international communication. The application of Blissymbols in these ways need to be recorded so that a critical evaluation can be made and so that successful new applications can be shared.

The Evaluation Study has generated more questions than it has answered. It is hoped that this Handbook will provide the impetus for further study and documentation of programs utilizing Blissymbolics.

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APPENDIX 1

SYNTAX SUPPLEMENT*

pages 235 - 250

*This Syntax Supplement is included here for your interest,
as the syntax recommended by C.K. Bliss.

OUR SYMBOL LANGUAGE IS ALIVE

Simple symbols for a simple universal grammar

by Charles Bliss

My dear Friends and Symbol Teachers,

No words and no symbols can describe my joy when I received a letter dated 28 October, 1971 (four years ago) written by Shirley McNaughton and signed by Maurice Izzard, telling me that my symbols had found a wonderful use, helping cerebral palsied children to become happy beings to happy parents. I was then in my 75th year and had resigned myself to dying without seeing my symbols come to life as a helping tool for mankind.

And one of the first symbols the children learned to use was "happy", a pictorial expression of "heartlifting" happiness . And Shirley had a stroke of genius when she chose this symbol for all publications coming out of the Ontario Crippled Children's Centre



For me, even the black and white of this new symbol have semantic and symbolic significance. Open up my big book, "Semantography-Blissymbolics" (in green cover) to page 298, or page 9 of my book to the film "Mr Symbol Man," and see how Sigmund Freud explained the dynamic relationships of emotion, reason and conscience within our mind.



Deep down in the blackness of our unconscious mind our emotions and our passions brood. Here we experience love and hate, happiness and unhappiness, attraction and repulsion, and many more feelings for which mankind has used the word "heart" because our heart misses a beat when our brains experience these feelings. And for many, many thousands of years boys and girls have pictured the feeling of love , the sweet pain we experience as if Eros (Amor, Cupid) has shot an arrow into our heart.

Then, as you can see from the symbolic drawing above, the mind advances upwards into the light of reason and conscience. And Shirley has depicted this by putting the heart symbol into the black and the upward shooting arrow into the white of the circle, giving us a vivid symbol for all good endeavours of mankind to bring happiness to all.

It was utter joy for the mute children to be able to point at the symbol for happy $\heartsuit \uparrow$. Later they learned the symbol for an upright standing human being of either sex with the feet apart $\perp$. Later they learned to add the number 1 for I $\perp_1$, the number 2 for you $\perp_2$, the number 3 for he and she $\perp_3$ $\times$. Then with the multiplication indicator on top they learned to symbolise we $\perp_1$ $\times$, you $\perp_2$ $\times$, and they $\perp_3$ $\times$. And together the first sentence, "I happy" $\perp_1 \heartsuit \uparrow$

This was a wonderful achievement, but these children are listening to their parents and friends and they soon learn the proper word order - "I am happy, you are happy, he or she is happy, we are happy." Sooner or later they want to learn the symbols for am, are, is. Then they hear other people say "I have happiness in my heart," so they want to learn the symbol for have and how to symbolise the difference between happy and happiness.

So you see, language is for living people and our symbol language must be alive too, and must be able to symbolise the different words mentioned above. And it's easy.

But it wasn't easy for me. Indeed when, from 1946 to 1949, I typed the 700 pages of the first edition of my big book "Semantography-Blissymbolics", the chapters on a universal grammar took me years to write. I went ahead with other chapters on symbols for postal communication, for railways, airplanes etc, for commercial, industrial and scientific use, and in between I tried and tried to solve the problems of my universal grammar. When at last I solved one problem I typed the chapter on it, then went ahead with chapters on other applications of my symbols. In the meantime I wrestled with another problem on grammar and by the time I had solved it another year had passed; and all the while I typed chapters unrelated to the problem of grammar. The result was that my chapters on a universal grammar are interspersed between hundreds of pages and difficult to find for any serious student of my symbol language.

This is why I now give away copies of my big book with an additional sheet listing the page numbers where the various chapters on my universal grammar are to be found. If you do not have this sheet my assistant, Tonti Dunne, who types this article will re-type the List of Grammar Chapters at the end. I hope now to have the time and the money to issue a third edition of my big book in which I shall rearrange various chapters so that all information on my universal grammar will be grouped together for easy accessibility and study. I am now 78 and I ask you to wish me luck in staying alive to supervise the arrangement, printing and publishing of this third edition.

But this muddle of my own making, with chapters on my grammar widely dispersed, causes difficulties as some of my grammar symbols for complete sentences are not used, and I am writing this article to put things right. Those of you who are used to the first grammar symbols introduced in 1973 may go on using them until you find that the proper symbols introduced now in 1975 are better.

And this is why I titled this article "Our Symbol Language is Alive," because life means constant change. We human being, confronted with problems, make some decisions until, at a later time, we find a better solution. The problems we are facing now is the use of my grammar symbols for other languages, notably French,

the second language of Canada. I do believe that the 1975 grammar symbols will satisfy the teachers who teach my symbols to children in Quebec province. If new problems arise - well - I am an engineer who knows that any tool needs constant improvement, and I do hope to be alive for a few more years and to be able to adjust my symbols to fit new problems in French or any other language.

This is exactly the difference between an engineer and a teacher of languages. The teacher preserves faithfully all the irregularities of his own language, and is not interested in abandoning them in favour of a simpler usage. I maintain that language is the human tool for communication and co-operation, and therefore we must strive to remove all illogical irregularities. We must be engineers of language. "Who makes language simple and logical?" asked one of the greatest linguists of our age, Professor Otto Jespersen. And he answered: "The children. They think logically." They learn to form the plural by adding an -s, as in "house and houses." Then they say "mouse and mouses." "No," says the teacher, "mice." The child says "goose and geese." "No," says the teacher, "geese." The child says "child and childs." "No," says the teacher, "children." The child says "sheep and sheeps." "No," says the teacher, "sheep, without an -s." Imagine the utter bewilderment. Imagine the time lost by all children in all languages. They have only a limited time for learning what they will need in later life, yet a disastrous part of their learning time is taken up by learning the irregularities of their own language.

When I was a child my logical sense was so strong that I simply refused to learn the irregularities of the grammar imposed on me. Only in later years did I find that a number of professors of languages deplored this state of affairs. Professor Guerard said: "Grammar, the torment of our childhood, is an exploded fallacy." Professor Brunot said: "A profound pity overcomes one thinking of the hundreds of thousands of children compelled to undergo an education composed of such aberrations," and Professor Jespersen said "The children, not the teachers, are making language logical and simple and easy to learn."

So, at present we must learn the different words "am, are, is." In German it is even more complicated, "bin, bist, ist, sind, seid." But look, today English-speaking people say "I will, he will, we will, you will, they will;" but not so long ago they had to say "he wilst." The children and the common people just dropped the "wilst," and soon we shall say "I do, you do, he do," NOT "he DOES." Soon we shall say "he do, he work, he think, he write." Soon, by introducing my logical symbols into the schools of the world we shall do away with the irregularities of grammar. Soon we shall do away with the nightmares of irregular verbs, and this brings me to the meaning of "verb."

"Verb" comes from the Latin verbum. It means nothing more than just "a word." But it has a dreadful meaning for all highschool students who are forced to learn the irregularities of verbs. The word is also used in German, but I remember how glad I was when I learned the merciful translation of the Latin word in every-day German. It means a "Zeit Wort" - a "time word" - a word which changes with the time: "I think, I thought, I shall think," present, past and future.

Now let's find a symbol for a "time word," and it has to be a pictorial symbol, easy to learn by little children. But time cannot be pictured. It took me years to find a pictorial presentation of time, and here it is. Imagine two parabolic mirrors facing to the left) and right (. Now, we of the Western world write from left to right. This then is the direction of our "flow of time"
 . Then this parabolic mirror) mirrors the words which we

have read just a few seconds ago in the PAST. And this parabolic mirror (focuses the words which we will read a few seconds from now in the FUTURE. Now we have two pictorial symbols for the "PAST") and for the "FUTURE" (. And the PRESENT is a fleeting glance between past and future)(.

T H E B I G A N D T H E S M A L L W O R D

Now here is a new grammatical presentation easy to understand by little children. I refuse to tell you the "proper" grammatical words for it. In my big book I call the "small" words "shorthand" words. Instead of saying "in the Past" we say "ago." Instead of saying "in the Present" we say "now." Instead of saying "in the Future" we say "then." But "shorthand" means nothing to little children. I had to find a better word for them, and so I call it "the big word" and "the small word." If you are interested in my wrangling for years to eliminate the grammar words and to find simple words for little children, read it up beginning on page 422 in my big book. And here is how it looks in words and in symbols:

	)	)(	(
The big word and big symbol for	PAST	PRESENT	FUTURE
	)	)(	(
The small word and symbol for	ago	now	then

T H E F I R S T T H R E E S Q U A R E S O F O U R " G R A M M A R B L O C K "

Here is a note by Tonti, who types these lines: "I have only two different type-faces for the words beneath the symbols. Charles tells me that wonderful Jim Grise draws the symbols better than anyone else in the whole world. When the word is too long to fit the square, he prints the word in a smaller type (which I cannot do). For this reason Charles is not drawing the squares here below and on the next pages - except at the end when the whole "grammar block" will be shown enlarged and I will try to type the words within the squares. So please note that the final symbol displays will show Jim's perfect handiwork."

We will have all grammar symbols displayed in a block, every row containing three squares for the past, present and future. And here is the first row:

))	)()(	((
past ago	present now	future then

Now take to hand my film book and read up page 103 titled "Some Symbols come in three sizes." See how I found an even smaller symbol for an even smaller meaning to express the PAST, the PRESENT and the FUTURE. I call these smallest symbols "indicators" and place them on top of other symbols, as for instance the symbols for the eye and the mouth.

	)	)	(
The smallest symbols <u>indicating</u> the	past	present	future
	)	X	(
	⊙	⊙	⊙
on top of the symbol for the <u>eye</u>	saw	see	will see
	)	X	(
	○	○	○
on top of the symbol for the <u>mouth</u>	said	say	will say

You can do this with hundreds of symbols, as for instance heard, hear, will hear; smelled, smell, will smell; ate, eat, will eat; thought, think, will think, etc. etc.

But I was still not satisfied. Let's use our smallest indicators above the symbol for a pen, pencil:

)	)	(
↘	↘	↘
wrote	write	will write

I said before that this symbol)(means now, and this symbol)(means present, and I said that the Present is a "fleeting glance between Past and Future." But I may continue to write and write for hours and hours. I had to find a better symbol for doing something now and continuing to do it now for a long period of time. And it had to be a pictorial symbol too, easily grasped and easily remembered. Here is how I solved this problem.

Imagine our young planet earth being a molten ball of fiery matter some billions of years ago. Then slowly it cooled down and a solid crust formed. But underneath the molten, glowing matter (magma, lava) was still swirling in gigantic waves, creating tremendous pressure on the thin crust above. And then it happened. The crust gave way and an observer in space could see the first primeval action on our young earth, the throwing up of a volcano cone, and here is my pictorial symbol for

the big word and symbol for

the Act, the Action, the Acting, the Doing

the small word and symbol for

and the smallest symbol as an indicator on top of any other symbol

	^	
	to act, to do	
^	^	^
↘	⊙	○
<u>to write</u>	<u>to see</u>	<u>to say</u>

THE THREE SQUARES FOR THE THREE TIME INDICATORS

As they will appear in the "grammar block" of our symbol displays -

)	^	(
<u>do, make action</u>	<u>do, make action</u>	<u>do, make action</u>
in the past	in the present	in the future

the indicator in the middle saying "do, make action" is already in the symbol displays. Now we add the other two, and are able to change the time word (verb) for many, many symbols. For instance:



washed, wash, will wash thought, think, will think knew, know, will know

But alas, instead of just "I washed" or "I thought" or "I knew" we can also say I have washed, I had washed, I have had washed, and I had had washed. I have thought, I had thought, I have had thought and I had had thought. I have known, I had known, I have had known and I had had known.

Is this necessary? Not at all. But we can write these sentences by adding our symbol for "to have" (see later). It was George Bernard Shaw who taught us these grammatical constructions are not necessary. We can drop the have, the has, the have had and (horrors) the had had. We had had it for too long. Shaw also prophesied that we shall one day say "I washed, I thinked, I knowed" and so on, adding an -ed for all past time words.

Who will make these beneficial changes? "The Children," said Professor Jespersen. And our logical symbols will help us to say also

^	^	^	^	^	^
^	^	^	^	^	^
I do	you do	he do	we do	you do	they do

Thus we will do away with does, washes, thinks, knows, and all the "is" and "are" for he or she.

We can do away with another obsolete grammatical word, the word "to", as in "to do, to be, to have, to make, to think," etc. etc. One teacher wrote me a letter in symbols. She began "I wish to thank you....." She worried how to symbolise "to think" and looked up the word co in the dictionary. And there it is symbolised

thus >|. But this means "to, toward." And it should be used in such sentences as "I write to you" or "I came to the house." What do these little lines really mean? They are the small symbol for the small words "to, towards." And what is the big symbol and the big word? It is approach → |

Look up the symbol displays and see that Shirley had done away with the to in the verbs. The words underneath the symbols say "have, be, make, wish, think," etc. etc., instead of "to have, to be, to make, to wish, to think" etc. Tell your child that there is no need for a symbol for the obsolete word "to." Make your child laugh about all the obsolete words and expressions which are not needed. Give your child a feeling of accomplishment, of triumph. Today many millions of healthy children feel unhappy and frustrated when they do not grasp the obsolete expressions as in "to have, to have had, to had had" etc. etc. Soon they will be "at the bottom of the class." Soon they will drop out and will be lost and feel lost and frustrated. And their language teachers are to be blamed for this.

So let us take heart and continue working out simple grammar symbols for your children.

THE THREE SQUARES FOR THE TIME WORD "DO"

All human beings in all countries of the world are doing something, even if they are asleep, or apparently doing nothing. Then their bodies are in constant action, in constant doings, chemical and physical. Therefore the verb do is one of the most important words in all languages. It is called an "auxiliary verb," but let me use the better German words of my childhood: "ein Hilfs Zeit Wort" - "a helping time word." And help it does. Let us now add three more squares in our symbol displays so that our children can be helped to form complete symbol sentences. We use, of course, the volcano outline for do, act ^ .

)	^	(
^	^	^
<u>did, acted</u>	<u>do, act</u>	<u>will do, act</u>

Here we encounter an English expression which has given me years of trouble and search in grammar books. The problem is: when should we say "I do" and when "I am doing." For me, the chemist and physicist, there was no difference, but I found that grammarians all differ widely when to say the one and when the other expression. I interviewed teachers of English and authors and highly intelligent Englishmen and Americans. None of them could give me a simple rule for simple children and simple people. There is no rule.

In the squares above I have outlined the simplest expressions only. I have not mentioned the cumbersome and illogical grammatical expressions such as:

Instead of did, acted,
we also say

did do, did act; have done, have acted; has done, has acted;
have been doing, have been acting; has been doing, has been acting, etc.

Instead of do, act
we also say

does and acts

Instead of will do, act
we also say

will be doing, will be acting, shall do, shall act,
shall be doing, shall be acting, etc.

If your child is intelligent, you can make it laugh about these complex expressions when a simpler expression is at hand. Those who can speak, no matter how difficult it is for them, let them use the shorter and simpler expression - until my symbols are taught to healthy children - and then they will revolt against the cumbersome expressions they hear. This is what G.B. Shaw prophesied: "Only a revolution or a civil war against our teachers of the English language will force them to make the English language logical and simple to learn and to use." The children, your symbol children, will spearhead this revolution, as heralded by Professor Jespersen who said: "The children, not the teachers, make language logical and simple and easy to learn."

Alas, there is another grammatical monstrosity here. We can say "I will do it" but also "I shall do it." All my search for a simple rule for simple children to follow has been fruitless. So let's stick to the simple "will" and let's take heart that the children and the simple people have already won out against the grammarians who had to give in and make "I, you, he, she, we, and they will" the "correct" grammatical expressions.

THE THREE SQUARES FOR THE TIME WORD "BE"

Here again we have the big word and the small word, or the big symbol and the small symbol. It is the difference between to live, to exist, to be and the smaller meaning of just to be. It is also the difference between living matter and non-living matter. A living creature lives, exists, is. A stone exists, is, but does not live. But sometimes we can use the smaller meaning for living beings in a smaller sense as for instance: I live in Canada, but I shall be in Toronto tomorrow and my car will be there too."

The difficulty of finding a good symbol for to live was enormous. I found that all biologists don't know what life really is. Professor Percy Raymond of Harvard said "What life is - nobody knows." If you want to read more about this, open the film book and begin reading on page 80, "The Symbols for "to be" and "to live." Then turn to page 155, "What is Life really."

The best I could do was to take the symbol for an individual human being, standing upright and being alive ⊥, and being alive only for one thing, our sun ○. If the sun blacked out, all life on earth would come to an end within minutes. Now we have the big and the small word, and the big and small symbols

⊥
to live

⊙
to be

Now we can draw up our three squares and underline the simplest expression -

)
⊙
was, were

^
⊙
be, am, are, is

(
⊙
will be

A day will come when we will say "I am, you am, he am," or even "I be, you be, he be," and we will be understood perfectly. Just look up a book printed a few hundred years ago and realise how many words have been simplified since. Consequently I have not printed the obsolete grammar words which we use today. Instead of "I was," we can also say "I have been" or "I had been." But "I was" is sufficient.

THE THREE SQUARES FOR THE TIME WORD "HAVE"

"To have" means having a plus of anything. Therefore we introduce the symbol for plus, addition $+$. Usually it is an earthly plus, money, things, a house, jewels, etc. Therefore we add the symbol for earth $______$ and together possession, ownership $\pm$. Now look, the combined symbol looks like a tombstone and I have devised it to look like one. The semantic and symbolic effect should be the message "You can't take earthly possessions with you into the grave. So stop accumulating them senselessly!"

And of course there is a small meaning and a small symbol too, meaning just "have" $\pm$. We may have $\pm$ a book, but it may be the possession $\pm$ of the library.

	$\wedge$ $\pm$	$\wedge$ $\pm$
The big and small symbol for	<u>to possess, to own</u>	<u>to have</u>
	$)$ $\pm$	$($ $\pm$
And now our three squares	had	have

Here again are some cumbersome expressions not mentioned above:

Instead of had we are also forced to say have had, has had, had had, etc.

Instead of have we are also forced to say has, we having, are having, etc.

Instead of will have we are also forced to say shall have, will be having, shall be having, etc.

We need only two more grammatical symbols, one for questions and one for negative sentences. But so far we have always had three symbols in a row [for past, present and future]. In order to have a neat block of grammatical symbols to appear in the 300 symbol display, let's have a third symbol in the last row of three, the symbol for the helping time word, make. This meaning is used in all languages. Here below are now the necessary explanations for the last row of three squares.

THE SYMBOLS FOR QUESTIONS

Here again we have the big word and the big symbol and the small word and the small symbol, and of course the smallest symbol as an indicator:

	?		
The big word and symbol	<u>question</u>	?	
The small word and symbol		<u>what</u>	?
The smallest symbol as an indicator			<u>may</u>

Now let's learn the semantics of these symbols. The big word question

?

 is a combination of the symbol for open and the question mark ? . When we close

?

 it we get the question closed by the answer

?

 . But watch out! Realise that within the enclosure the question mark is still lurking. And this is a warning to be wary. Many answers to pertinent questions are often no answer at all. They are only a fumbling with vague and ambiguous words.

The small word is what ? and many questions begin with the word what? We have already learned the meaning of combinations, as for instance what ? person

|

 means who ?

|

 . What ? place (on earth)

|

 means where ? . What ? time

|

 means when ?

|

 . But watch out! This symbol ?

|

 means what thing? This symbol ?

^

 means "what action brings a result about," and the small word how? as in "how do you do this?"

It is clear that when we begin a sentence with Who ?

|

 as in "Who is that man?", we don't need a question mark at the end, as we have one already at the beginning of the sentence. So let's drop the second question mark. Some Spanish linguists realised the need for a question mark at the beginning, but they solved it in a cumbersome way. They put two question marks to every question sentence, one at the beginning and one at the end. Not satisfied with this cumbersome arrangement they turned the first question mark upside down as in ¿Who is that man? By doing so they need a second question mark (upside down) on their typewriters.

We know that we reverse the sequence of words in a question as in

You have a pencil.

Have you a pencil?

The same arrangement exists in French, German and other languages, but thinking of a universal sentence construction for all languages I prefer to use the same word order, but putting the question mark at the beginning as in

You have a pencil.

?You have a pencil.

However, you, the teacher, are free to use the word order common in your language. See to it, though, that a question mark appears at the beginning of your

symbol sentence, be it the symbol for question  to mean "the question is," or the symbol for what ? , or in the combinations who ?  , where ? , when ?  etc.

Now we come to a wonderful and simple use of the question mark in the smallest size as an indicator on top of other symbols:

?

may

The child will point first to this symbol, then to other symbols, for instance the symbol for do, for be, and for have, and will thus get

?	?	?
^	⊙	±
<u>may do</u>	<u>may be</u>	<u>may have</u>

and so on with any of the many action words in the symbol displays.

THE SQUARE FOR "MAKE"

In order to fill three squares in our new block of grammar symbols I have added here the symbol for make  . Here again we have the big word and big symbol, and the small word and small symbol. We begin with the big symbol  which is the symbol of the Greek philosophers of old meaning Creation and Creator - God, displaying divine order and harmony in geometrical configuration as found in crystals. Then we designed our smaller symbol for man-made creation, make  . This is a very important symbol as this meaning is used in all languages. All over the world human beings of all countries and all languages make things, and we can use this symbol in many ways, as for instance making food   , and a man who makes food, a cook    , and a room for making food, a kitchen    .

And now we can use this symbol for make with any of the small indicators in our big block of grammar symbols. The child would first point at one or two indicators and then at the symbol for make.

)	^	(	?)	?	(?)
					
<u>made</u>	<u>make</u>	<u>will make</u>	<u>may (have) made</u>	<u>may make</u>	<u>may make (then)</u>

HERE IS OUR COMPLETE SYMBOL GRAMMAR BLOCK

This enlargement is not proportionately correct. I have not the proper templates and Tonti has not the proper typefaces. But Jim will draw the symbols as only he can draw them and will print the words to fit the squares.

And Shirley will put this "grammar block" into the "handiest" place (for the crippled hands to reach) in the 400, 200 and, I hope, also in the 100 symbol displays because these words are vital for the mute palsied children to point out "I am, I was, I will be, I did, do, will do, I had, have, will have, I made, make, will make, I may or may not."

Then by using these symbols and indicators on other symbols in in the displays the children will form complete grammatical sentences.

And what palsied children can learn easily their parents, brothers, sisters, relatives and friends will have to learn too in order to understand them. And it's easy.

Children like to invent their own fairy tales. They may point at the past, ago symbol) and this may mean

"Once upon a time ... "

There will be no need to use the symbols for once, upon, a and time. This is the fantastic simplification with symbols. This heralds a new future of simple and logical speech.

Yes, the "grammar block" will help them to express their needs and their need to express themselves to the world. And the world will learn to do away with obsolete grammatical expressions.

))	) () (	((
past ago	present now	future then
)	^	(
do, make, ^Action in the past	do, make, ^Action in the present	do, make, ^Action in the future
)	^	(
^	^	^
did, acted	do, act	will do, act
)	^	(
⊕	⊕	⊕
was, were	be, am, are, is	will be
)	^	(
±	±	±
had	have	will have
?	^	
	△	—
may	make	not

Here is how you can teach your child to handle the grammar block. Let it point first at the symbol for I $\perp_1$, then at one of the three time symbols for did $\wedge$, do $\wedge$, or will do $\wedge$ to form the sentences "I did, I do, I will do." Then let the child symbolise "I was, I am, I will be." Then "I had, I have, I will have."

How will the child symbolise "I made, I make, I will make?" Teach it to point first at the indicator for past $\wedge$ or present $\wedge$ or future $\wedge$ and then at the symbol for make $\triangle$. But the child will soon simplify this. There is no need to point first at the present indicator $\wedge$ because the symbol for make $\triangle$ shows already the present indicator on top. And many symbols in the displays show too the present indicator on top $\wedge$ as for instance help $\wedge$, think $\wedge$, know $\wedge$, wash $\wedge$, etc.

But many symbols in the displays do not show any indicator on top as, for instance, mouth $\bigcirc$, eye $\bigcirc$, ear $\bigcirc$, food $\bigcirc$, etc. because they do not symbolise a time word (verb). They symbolise real things, and the child can turn them into time (action) words for the past $\wedge$, present $\wedge$, and future $\wedge$ by pointing first at the indicator symbols. Thus it will get "I said, I say, I will say," "I saw, I see, I will see," "I heard, I hear, I will hear," "I ate, I eat, I will eat" and so on with other thing words.

Now teach the child how to use the indicator for may $?$ to symbolise "I may eat." It would point first to the symbol for I $\perp_1$, then to the indicator may $?$, then to the indicator for present $\wedge$, and then to the symbol for food $\bigcirc$. Or the child wants to say "I may eat (later)." It would repeat the sequence but would point at the indicator for future $\wedge$. What happens, then, when the child points to the indicator for the past $\wedge$? It wants to say "I may have eaten."

And so to questions. The child wishes to symbolise "May I have food?" or "May I eat?" Teach the child to point first to the symbol for question $?$. After that there is no need to reverse the words to "May I?" The teacher or parent knows now that a question is coming. The question is: "I may have food" or "I may eat."

CUMBERSOME AND SIMPLE SYMBOL GRAMMAR

Dear Teacher, here is your choice. You want to help brain-damaged children to express complete grammatical sentences. The question is: will you give in to the idiocies of "correct" but complicated grammar? If you do this with your brain-damaged children you will do them a great disservice. Indeed you will add to their troubles. Better teach them simple grammatical sentences and make them laugh about the cumbersome grammatical sentences. As I have shown in previous chapters some cumbersome grammar, let's now list such sentences and see for yourself, and teach your child to see for itself, how we can use simple grammar and can avoid the cumbersome grammar.

Most of the following sentences begin with I 1 or you 2 , but we will not repeat the symbol in all sentences. At left we will list and symbolise grammatical sentences in the proper word order, and at right we will show that we can express the same meaning in simple grammatical sentences. I begin with the simplest sentences which cannot be improved further. Then we will go on to the cumbersome grammar sentences and will show that simple symbols can do the job better. All the time keep the new grammar block in mind.

SYMBOL SENTENCES in the proper word order

For the present

I do, I am, I have, I go
I am doing, I am being, I am having,
I am going

For the past

I did, I have done, I had done
I was, I have been, I had been
I had, I have had, I had had
I was doing, I have been doing, I had been doing
I have done, I had done
I went, I did go, I was going, I was gone
I have been going, I had been going,
I was going to go

For the future

I will, I shall
I will do, I will be doing, I shall be doing
I will be, I shall be
I will have, I shall have, I will be having
I will go, I will be going, I am going to go
I am going to do
I am going to have

and in the simplest word order

I do, I am, I have, I go

I do, I am, I have, I go

I did

I was

I had

I did

I did

I went

I went

I will

I will do

I will be

I will have

I will go

I will do

I will have

QUESTION SENTENCESFor the present

Do you do ... ? Are you doing ... ?	? you do ...
Are you being ... ?	? you are ...
Do you have ... ? Are you having ... ?	? you have ...
Do you go ? Are you going ?	? you go

For the past

Did you do ... ? Were you doing ... ?	? you did ...
Were you being ... ?	? you were ...
Were you having ... ?	? you had ...
Did you go ? Were you going ?	
Have you been going ?	? you went

For the future

Will you do ? Will you be ? Will you have ?	? you will do, will be, will have
Will you go ? Are you going to do ?	? you will go ? you will do
Are you going to be ? Are you going to have ?	? you will be ? you will have
Are you going to go ?	? you will go

First show your child the cumbersome sentences at the left, then the simple sentences at the right. Tell your child to symbolise, symbol by symbol, the cumbersome sentences at the left, then the simple sentences at the right. After such exercises the child may refuse the complex symbolisation and may do the simple symbolisation - and laugh at you. Then use the same procedure with many other time words (verbs) in the symbol displays, until the child has a thorough knowledge and aversion to the complex grammar forced upon us by the grammarians. Then you have won a victory.

Are we at the end of all this? Goodness no. There are some other atrocities like could, and would, and should, and ought to, and might do, and must do, and instead of must do you can say you have to do, or you have had to do, or had had - oh no! Let's not start again. Let me show you in another article that we can overcome all this, and simply, too.

A SUMMARY

In 1973 the children learned of the Action (verb) symbol for turning a THING word into an ACTION word. In 1972 they learned of the evaluation (adjective, adverb) symbol for their feelings and reasoning. Then came the symbols for to be and to have. In 1973 they learned to use the symbols for ago), now) (, and then (to express the past, present and future. It worked well with some English expressions and not so well with other English and French expressions. In 1975 Shirley presented me with a long list of complex English expressions (see pages 15 to 18) and asked me to work out a simple, comprehensive "grammar block" for all languages. It was easy (see the next pages). I simply looked up the relevant chapter on my universal grammar.

Since 1942 I tried to find expressions which I cannot symbolise. Since 1943 in all my lectures I harangued sceptical audiences to give me difficult expressions to symbolise. I did so well that there was applause in mid-lecture. So please, dear symbol teachers, take heart and discard cumbersome expressions.

Shirley discarded the word "to" in the infinitive to do, be, and thus she ended the grammarians' fight about the "split infinitive." In English we have one word for "not" and one symbol — | . In French there are two words, "ne" and "pas." Are you going to use the "not" symbol TWICE? Suppose there is a language which uses for the past this string of words: "did do have had been done bongo." I know what you will do. Bang goes bongo and only "did" will remain. So I say "God's speed to you, dear symbol teachers! Keep our symbol language alive and make it simple for all the children of mankind.

○ ← → Good bye, So long, Till we meet again, Au revoir, A rivviderci,
Auf Wiedersehen, etc. etc. Yours $\overset{x}{\underset{12}{I}} + \frac{\text{forever}}{\text{forever}}$ (Charles

APPENDIX 2

GRAMMAR BLOCK AND
INFORMATION SOURCES FOR PROGRAM SECTION

pages 251 - 252

A. Grammar Block

))	)()(	((
past ago	present now	future then
)	^	(
make action in the past	make action in the present	make action in the future
)	^	(
^	^	^
did, done	do, does	will do
)	^	(
⊕	⊕	⊕
was, were	be, am, are, is	will be
)	^	(
±	±	±
had	have, has	will have
?	^	-!
may	make, makes	not

B. Information Sources for Program Section

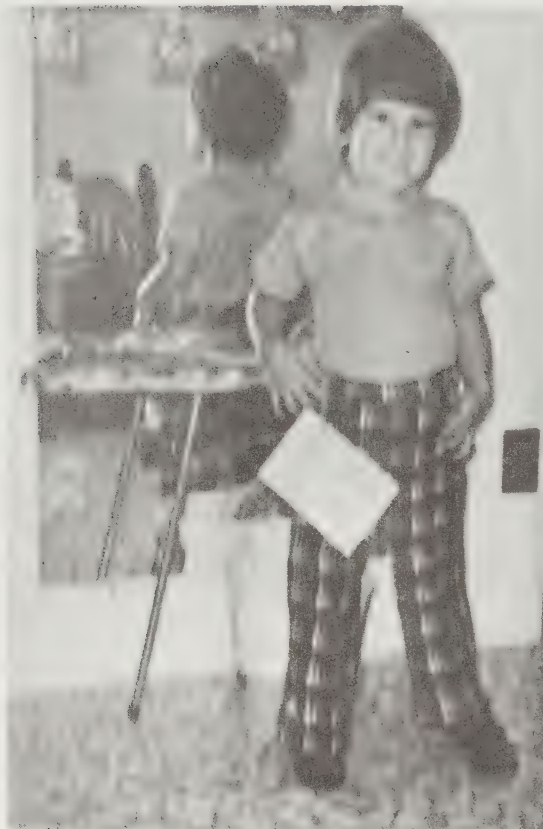
<u>Source</u>	<u>Information Obtained</u>	<u>Utilization of Information</u>
1) Evaluation study, questionnaires, interviews, May Evaluation Workshop (p. 15)	Recommendation of symbol instructors.	To provide: curriculum procedures and content; suggestions relating to program implementation.
2) Descriptive Statistics relating to total population, retarded sub-population, non-retarded sub-population. (p. 5)	Data relating to curriculum content, instructional materials, time allocation, teaching approaches.	To provide awareness of potential scope of Blissymbolics for diverse populations.
3) T. test for related samples (p. 149) (Silverman, '76, appendix VI).	Variables showing a change which can be interpreted as related to the symbol instructional program.	To suggest areas for consideration with regard to program content, structure and evaluation of progress.
4) Regression analysis (p. 32) (Silverman, '76, appendices VII, VIII, IX)	Variables closely related to SYMSKILL.	To isolate factors for on-going evaluation by informal observation and by formal recording procedures.
5) Analysis of variance (p. 153)	Independent variables (age, I.Q., disability, experience) demonstrating an effect upon program performance (dependent) variables.	To suggest differences in program objectives and content for particular populations.
6) Informal examination of case studies of symbol users who regressed or showed little progress in SYMSKILL	Program factors which recur with low symbol achievement.	To provide insight regarding general program considerations.
7) BCF-OCCC Workshops and unpublished papers	Suggestions from presentations, studies, discussions.	To supplement information obtained through <u>Evaluation Study</u> .

APPENDIX 3

DISPLAY TYPES AND CODING

pages 253 - 286

A. Display Types



1. Portable display for ambulatory child is plastic coated and is attached with elastic to belt so its use does not require removal.



2. Display of any size can be folded and secured with Velcro (top).
3. Waistband also fastens with Velcro (bottom).

#1-3 submitted by:
Mrs. Lois Valentic
C.P. Centre
82 E. 36th St.
Hamilton, Ontario



4. (top) Folding board with carrying handle, may be carried in folded position.
5. (bottom) Folding board may also be slipped into a plexiglass covered tray for full display mounted on wheelchair.



6. (left) Tri-fold display with belt clip, can be attached to belt (etc.) or (right) inserted into sturdier mounting. Velcro may also be used to maintain fold and/or attach to child.

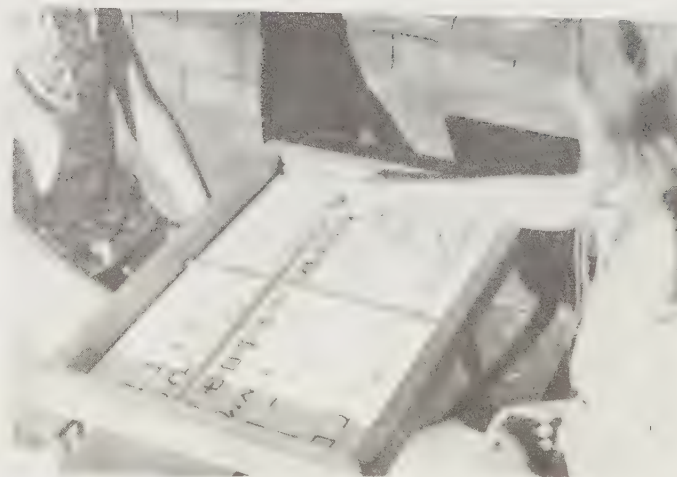


7. (left) Board can be tilted to specification by adjusting centre joint of upper and lower rods. For use on floor or wheelchair table (right).

#6, 7 submitted by:
 Grace Skanes
 Kitchener-Waterloo Rotary
 Children's Centre
 828 King St. W.
 Kitchener, Ontario



8. Spelling board with recessed figures for more accurate targeting.



9. Display board as designed by C. K. Bliss. Vertical divider slides up and down display as an indicator.



10. (top) Plastic covered tray with rim is hinged for easy insertion of display. (bottom) Fits on wheelchair (for construction, see Fig. 3a-g, p. 285.)

#10 submitted by:
R. Holte and S. Loeker
Society for Crippled
Children and Adults
825 Sherbrook Street
Winnipeg, Manitoba

11. BATTERY OPERATED



Display is semi-circular and clamps onto tray by 3" metal clip running the full length of the base of display. Symbols are pasted onto Bristol-board and inserted behind perspex (clear plastic). Symbols can be arranged in similar sequence to 100, 200 and 400 OCCC displays and also in numerous rows with colour coding. Motors are 4 rpm or 1 rpm and placed centrally behind board. Pointer can be made to work in a full circle with on/off switch and handle. Control can also be made by pressure pad.



(top)

For child with strong a.t.n.r. and requiring as many symbols as possible.

(middle)

Same but with on/off switch-- better for children with strong s.t.n.r.



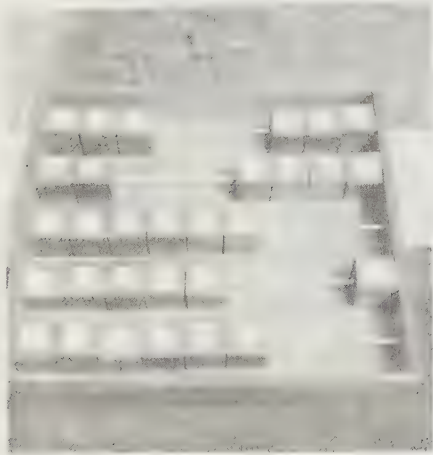
(bottom)

For the "younger set". Display has room for symbols-- some pictures and large yes/no. "Snoopy" control is activated by squeezing or taped to desk and used as on/off pressure.

Plans for #11 will be available from the National Research Council (see p. 277).

12. SENTENCE BUILDERS

An attempt to provide a child with some means of working alone on sentence building



(top)

The abacus is arranged top to bottom instead of the more usual left/right display. Made by a parent.

people	)	blocks are moved to
verbs	)	the right from the
adjectives	)	child's selection in
nouns	)	each horizontal group.
	)	Then the message is
	)	read downwards.

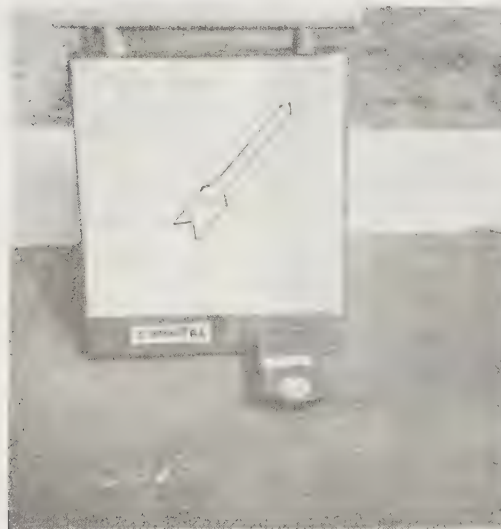


(bottom)

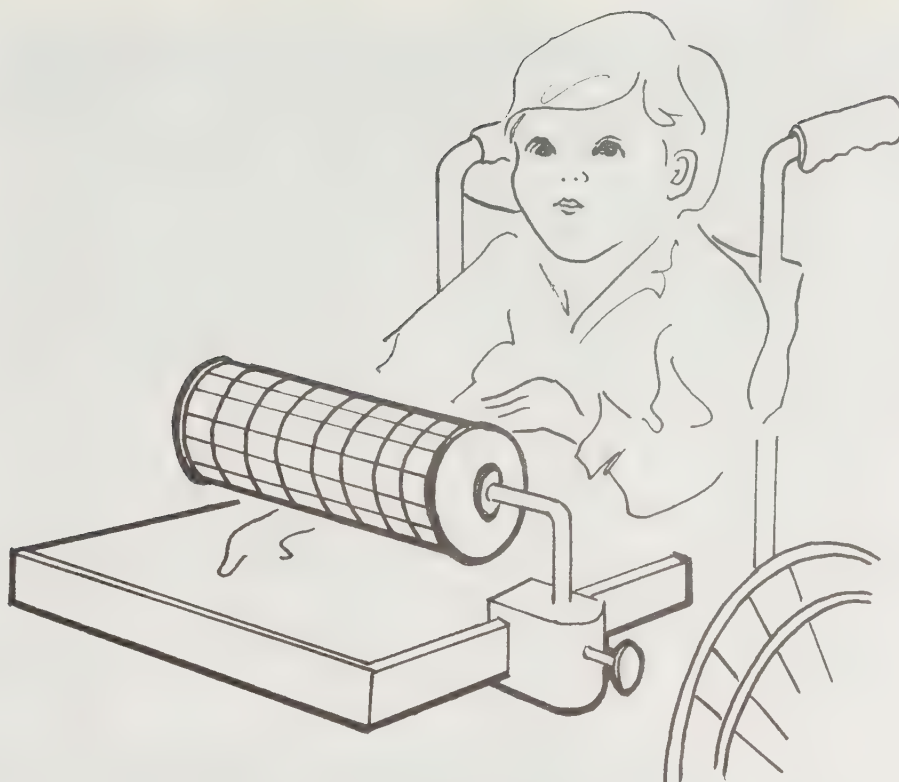
The slideboard is the same idea but manually much easier. Each handle has a small pointer on the bottom. There is not enough friction on this present model-- NRC is presently making another with magnetic plastic on the bottom of each pointer so that the child can work against resistance.

13. PORTABLE FAMILY UNIT

This was made by a parent who was a metal worker. It is the same principle as the National Research Council model but made with a wide base for standing on any table, floor, etc. Individual Bristol-board display is pasted on the front surface. The motor is housed inside the triangular unit. On the lower right is a platform which can be pulled out or pushed in. When pulled out, it becomes a pressure on/off switch to activate the pointer. Handle at top.

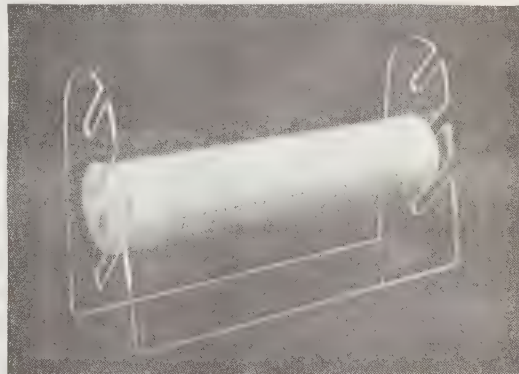
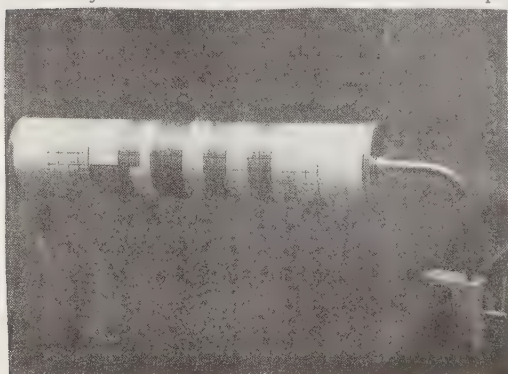


#11-13 submitted by:
Ann Warrick
Ottawa Crippled Children's Treatment Centre
Ottawa, Ontario



14. CYLINDER BOARD

This is a freely rotating transparent plexiglass cylinder containing a symbol display. The device is attached at a convenient spot on the child's wheelchair tray and encourages head to be held erect. Rotating the cylinder to locate the appropriate symbol contains an element of play and is readily available during meal-time. The cylinder is detachable for portable use.



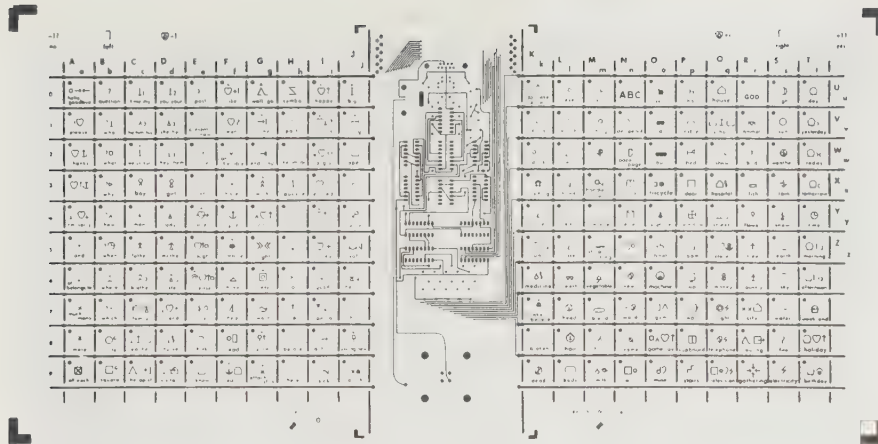
#14

submitted by:

J. Coutu, A. Dardenne,
R. Levy, K. Waksvik
Clinique de design
Montréal, Québec

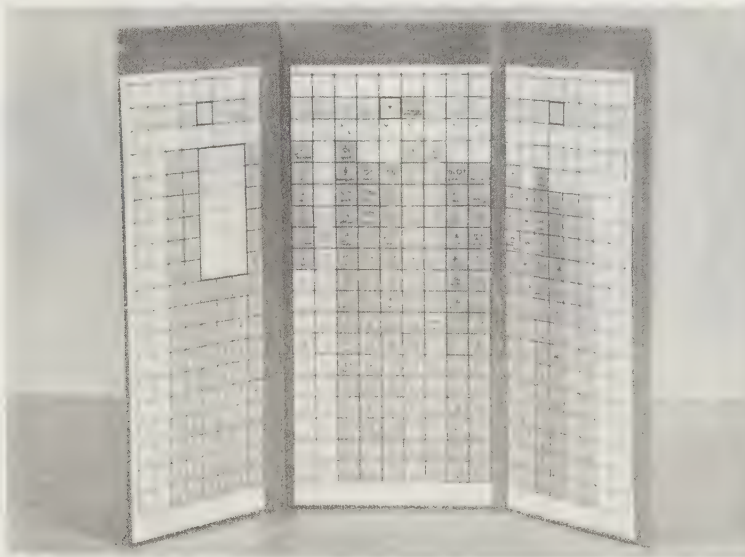
Dedicated to the Bliss Team of the Ontario Crippled Children's Centre, Toronto, Canada
 In order to prevent a new Bliss, the Blissymbols and their likely derivations and variations are protected by all copyright laws until well over the year 2022

The B. E. S. T. Bliss - for Handicapped and Normal										Everingham Symbol Table Children, Students and Adults																																							
Science + Technology					Medical					Trade + Mail					Transport					Moves					Speech					Questions + Alternatives					School					Leisure					Outing				
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16. S.C.R.P. "100 + 100" MKII DISPLAY

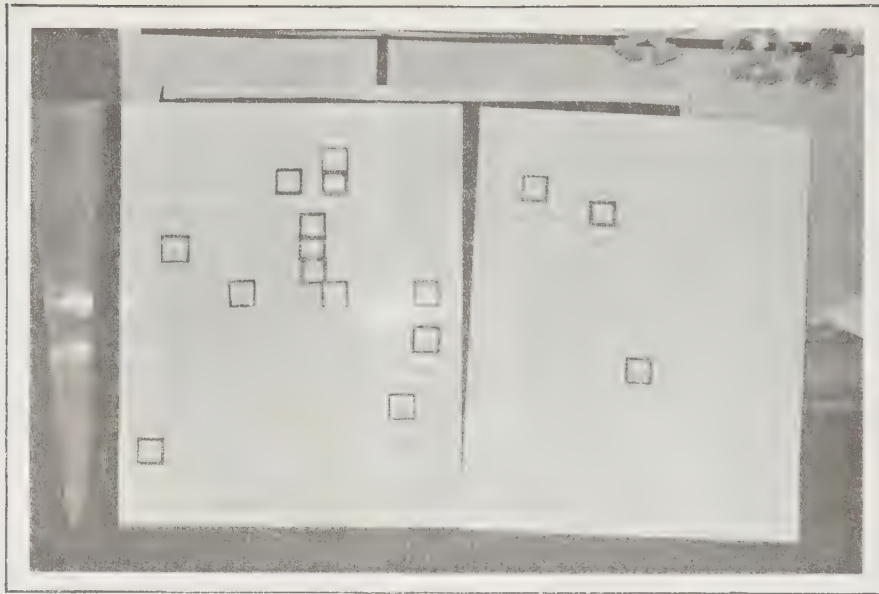
This is a light portable unit, capable of displaying 200 symbols in two 10 x 10 symbol sets. The desired symbol is indicated by activating a small red light (light emitting diode) located in the corner of each symbol. The symbols are selected using a scanning technique. Using a joystick, one can sequence in four directions.



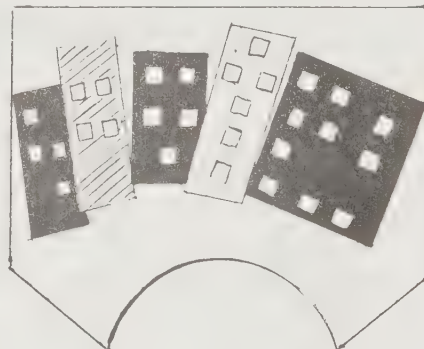
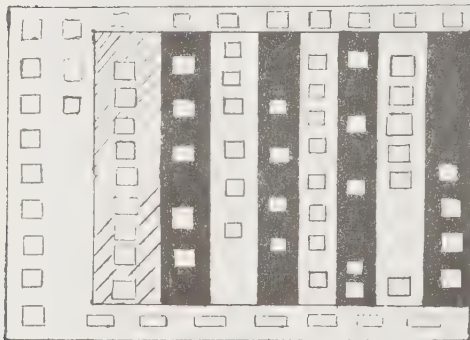
17. O.C.C.C. FOLDING PORTABLE DISPLAY

This case accommodates the standard B.C.F. display. It is backed with sturdy vinyl with a clear acetate sheet for surface protection.

#16, 17 submitted by:
Ontario Crippled Children's
Centre
Toronto, Ontario



18. Colour may be utilized to aid in visual discrimination.
 (top): Desired symbols are framed with colour; (below):
 colour provides background upon which symbols are mounted.



#18 submitted by:

(top) Grace Skanes
 Kitchener Waterloo Rotary
 Kitchener, Ont.

(bottom) Joan Watts
 Keith Bovenschen Training
 School
 12345 Frazho Road
 Warren, Michigan 48084

19. EYE-POINTING

Due to the severity of physical involvement, some children are not able to use a finger or fist to point, while still maintaining accuracy and reliability. If there are factors prohibiting experimentation with electronic devices, eye pointing may prove to be the most efficient mode of response. Through the use of eye pointing as the expressive mode of response, the most severely involved child may be able to give rapid, accurate and reliable indications of symbol choice.

Suggested Training Steps Using
Colour and Position Coding:

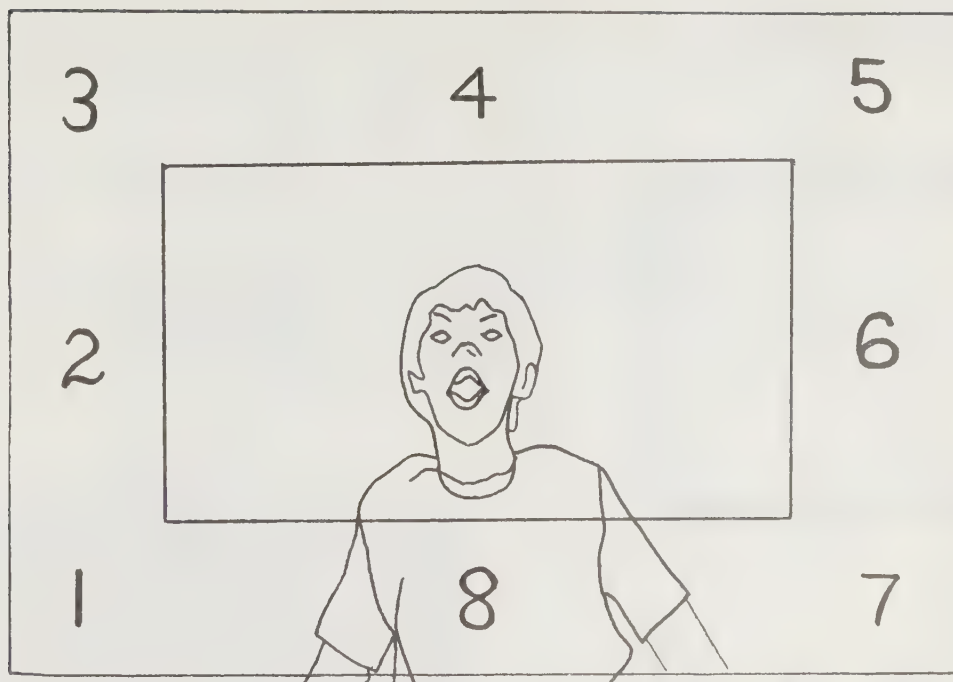
1. Establish two gross eye pointing positions (left and right of the vertical midline) which allow for a reliable indication of choice.
2. Establish colour associations (for example, red and green) with the two positions learned.
3. Transfer the two colour coded eye pointing responses from the horizontal to the vertical plane.
4. Establish 10 colour coded eye pointing positions on the plexiglass sheet (vertical plane).
5. Develop a 10 symbol, one colour code eye-pointing communication board.
6. Develop a 10 symbol, two colour code eye-pointing communication board.
7. Establish 'yes' and 'no' response positions on communication board.
8. Transfer use of two colour code eye-pointing response to 100 symbol board.
9. Establish 10 number coded eye pointing positions on a plexiglass sheet (vertical plane).
10. Train the child to retain and eye point to sequences of two or three numbers.

11. Transfer use of number coded eye pointing response to 200 symbol board and/or 400 symbol board (symbols are numbered consecutively, starting from upper left corner (#1) to the lower right corner. See Appendix 11 for complete instructions.

#19 submitted by:

P.J. Conner
Como School
St. Paul, Minnesota

20. THE NUMBER ETRAN



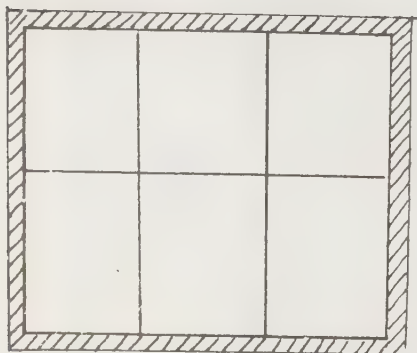
This figure illustrates the NUMBER ETRAN, designed for young children who have a comprehension of numbers. Numbers may be expanded upon or rearranged.

The ETRAN ("Eye-training scanning device") is a clear plexi-glass display with cut-out centre, designed for children who have reasonable head control and relatively good control of their direction of eye gaze. Numbers/colours (coding) or pictures/symbols (direct viewing) are arranged clockwise from the listener's perspective and may face either child or listener. For the Number Etran or one that makes use of colour coding, the child and listener must have visual access to a symbol display that has been pre-numbered or pre-coloured to use as a master list. The matrix may be adapted to the child's targeting ability.

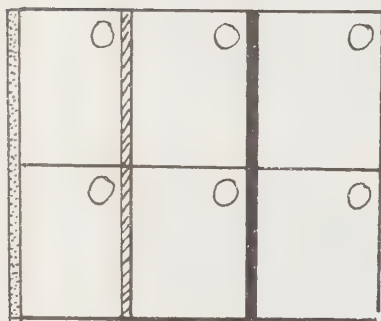
To indicate his selection, the child looks at his choice until it is verbally correctly identified; only at the end of each selection does the child look directly at the listener (for number coding: double numbers such as 11, 22 should be avoided). When the listener repeats the indicated message correctly, the child confirms that the message was relayed correctly by a glance upward, otherwise, he glances downward and repeats his steps.

#20 submitted by:

Trace Research & Development
Centre, University of Wisconsin
Madison, Wisconsin 53706

CODING FOR ETRAN:

21. Outside colouring (shading) pinpoints general location. Inside colouring indicates specific symbol.



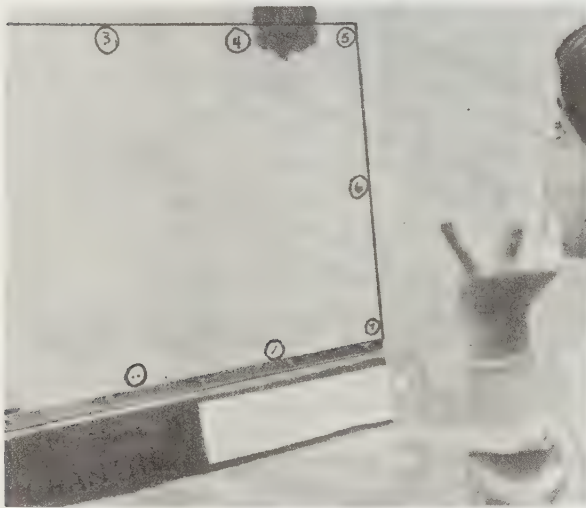
22. Line colours (shaded) pinpoints general location. Dot of colour indicates specific symbol.

1	2	3	1	2
4	5	6	4	5
7	8	9	7	8

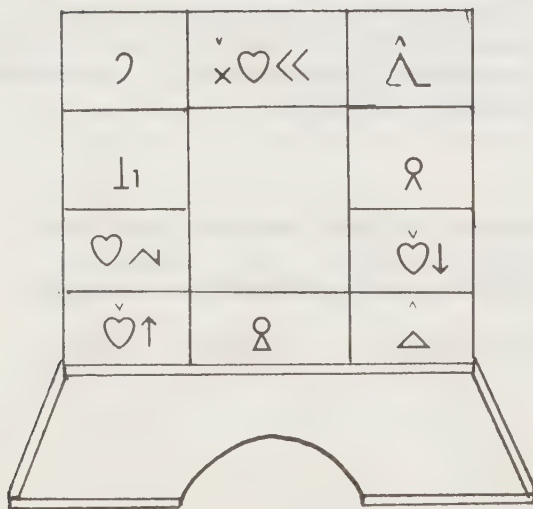
23. Area coloured (shaded) for general location. Number indicates specific symbol.

01	01	01	02	01	03
02	01	02	02	02	03
03	01	03	02	03	03

24. Display is numbered by row and column for ETRAN coding by number.



25. Child indicates symbol by row and column number.
 (•• indicates "repeat/again")
 (/ indicates error, to "strike out")

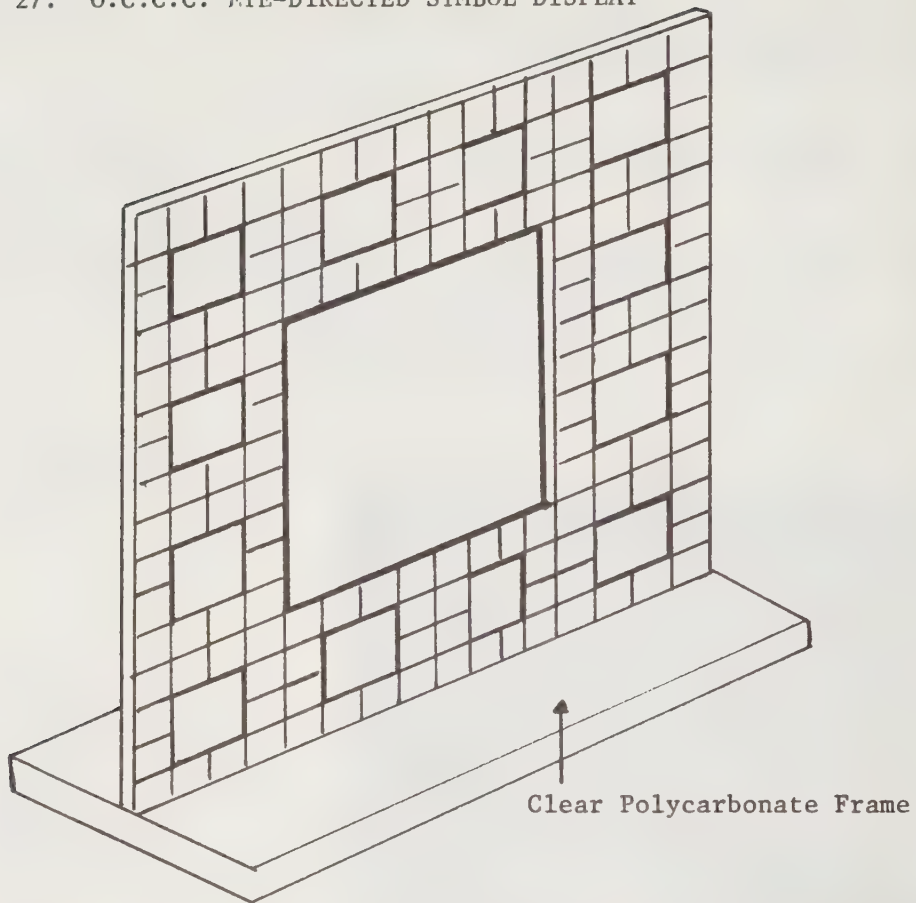


Direct Viewing

26. Child may indicate his thoughts directly rather than through coding. Vocabulary is restricted however to child's targeting ability. Useful for beginner or for emergency use such as illness.

#21-26 submitted by:
 Anne Warrick
 Ottawa Crippled Children's
 Centre
 Ottawa, Ontario

27. O.C.C.C. EYE-DIRECTED SYMBOL DISPLAY



Consists of a large clear plastic frame. Symbols are placed around the margin of the frame. A person communicates with the child by looking at the child's eye and head movements through the clear central area of the frame. The child looks at a specific quadrant which contains the symbol wanted. The symbols within a given quadrant are arranged in the same manner as the quadrants are arranged about the periphery of the frame. Hence the child can indicate exactly which symbol he wants within a specific quadrant by a second look at another quadrant which corresponds geometrically to the location of the desired symbol.

Advantages:

- (a) Method seems to work with some of our most severely involved children.
- (b) When using the device the children remain relaxed in a proper upright position.
- (c) Forces person to have face to face contact with the child as in normal conversation.

Disadvantages:

- (a) Is a very large bulky device.
- (b) Coding is quite complex to the uninitiated.
- (c) Is difficult in a classroom setting since it requires the complete attention of the teacher.
- (d) One party must look at the symbols reversed.
- (e) It requires intense visual concentration and is therefore difficult for those children lacking precise visual acuity.

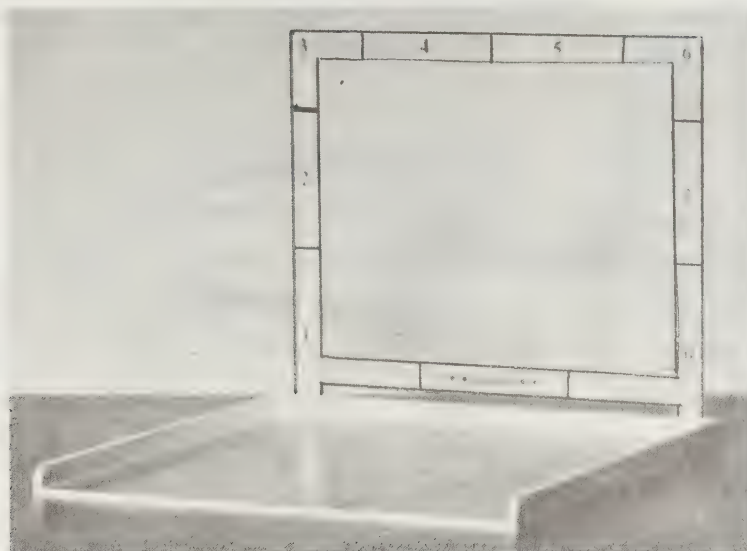
28. THE WOODEN ETRAN

Open:

24" x 17½"

Shut:

7½" x 17½"



This photograph illustrates the wooden ETRAN, designed for adults. This design allows for usage of the 400 symbol display.

The wooden frame (22" x 20") is placed on the user's tray. Numbers appear on both sides of the frame for the convenience of the communicator and the listener. In order to facilitate use with the ETRAN, the 400 vocabulary was numbered with the column number appearing in the top left corner and the row number appearing in the top right corner (see p. 273, top).

Instructions for use are given on p. 271. The student indicates that he is ready to begin by first establishing eye contact with the listener. The column number is given first, followed by the row number; if a number has 2 identical digits, the number is given once and followed by the indication for 'again'.

A sequenced list (for the listener) of symbols and their translations may be more useful than following on a 400 display. For adults who spell, it may be more convenient to access the letters with a 1 number code.

This system was designed on a base 8 system, to be compatible, in the future, with displays that may be accessed through a calculator-type device.

#27,28 submitted by:
 Ontario Crippled Children's
 Centre
 Toronto, Ontario

CASE EXAMPLE OF EYE CODING

(Sherry)

Sherry's wheelchair tray carries six large coloured blocks. The colours correspond to the coding of the Bliss board. Superimposed on the large blocks are six grid blocks 8 inches x 8 inches, each colour coded in vertical rows carrying symbols. On the left side each large block is numbered 1-8.

When Sherry talks she:

1. Points with her eyes to a large colour block to show you which section she wants,
2. She eye points again to a colour block when you ask which vertical row,
3. When you ask which symbol, she eye points to a number which takes you horizontally to her symbol.

Sherry's board carries the numerals from 1-10 around the top (which is slightly raised). She uses the numerals for mathematics also.

submitted by:
Villa Hospital
Thornhill, Ont.

29. MECHANO-ELECTRICAL COMMUNICATION BOARD

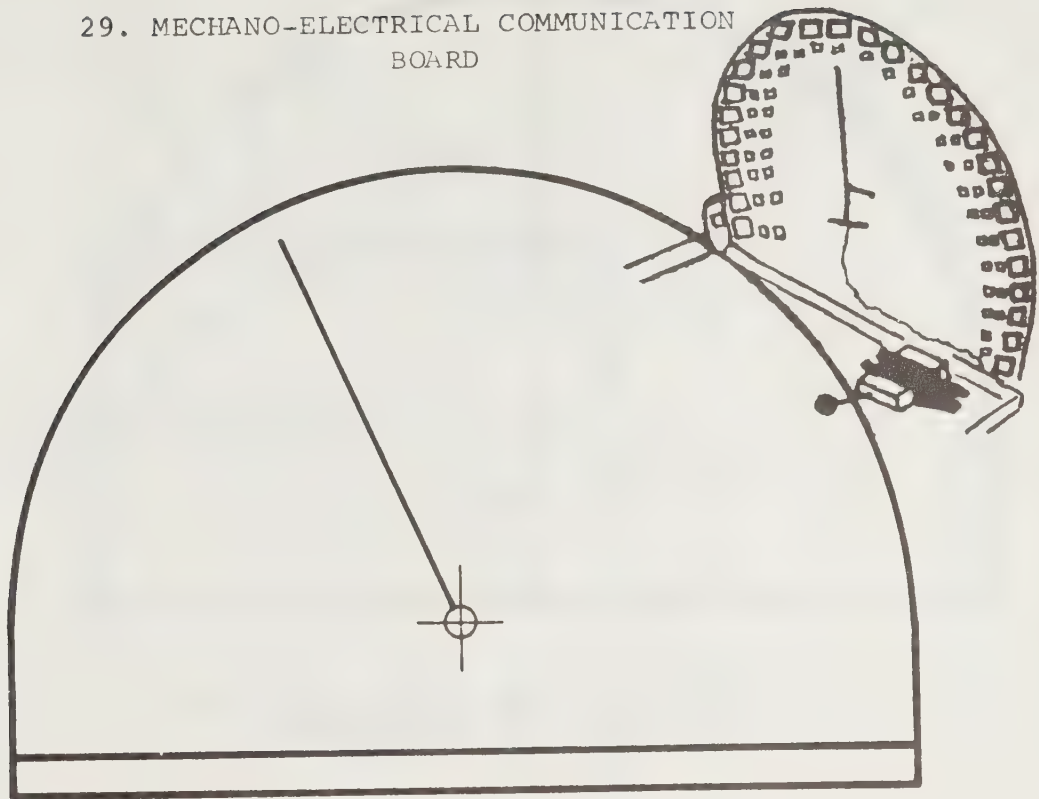


Fig. 1a Board elevation

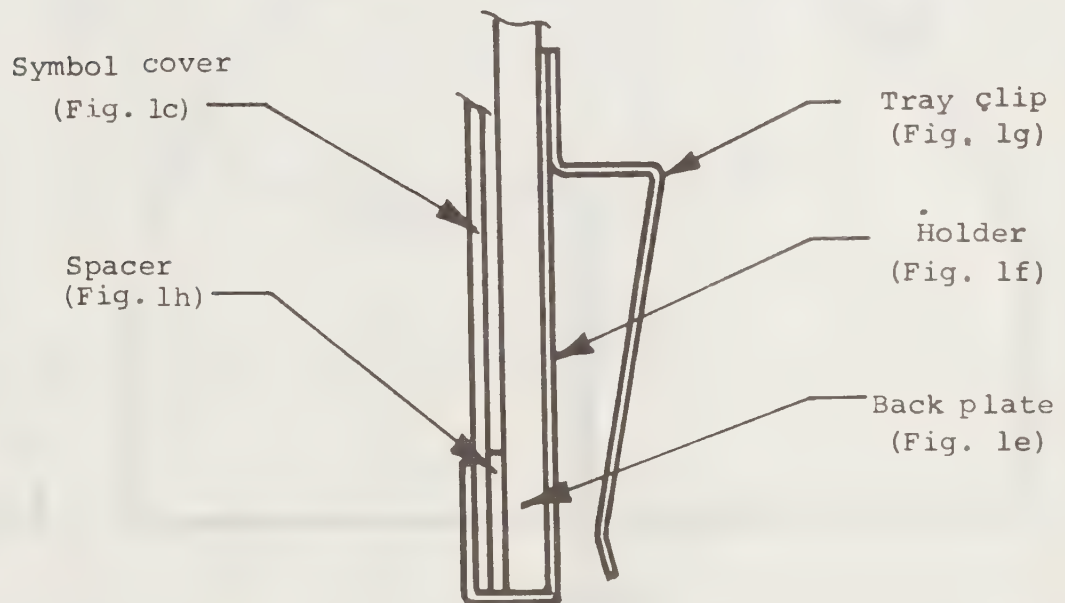


Fig. 1b Part section

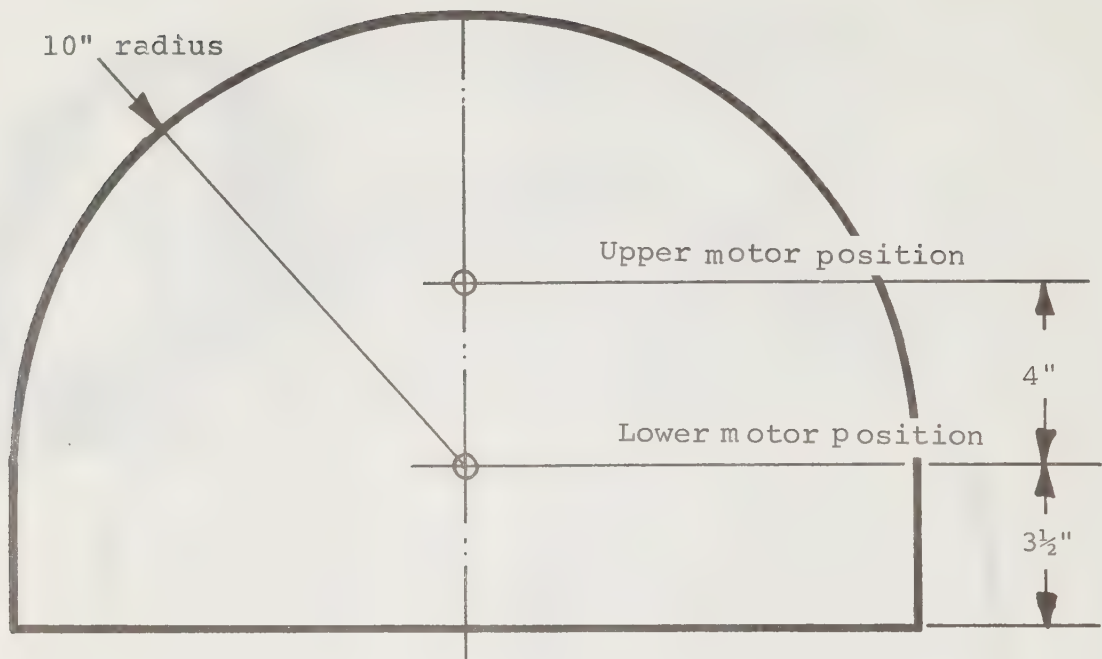


Figure 1c
Symbol cover (1/2" clear perspex)

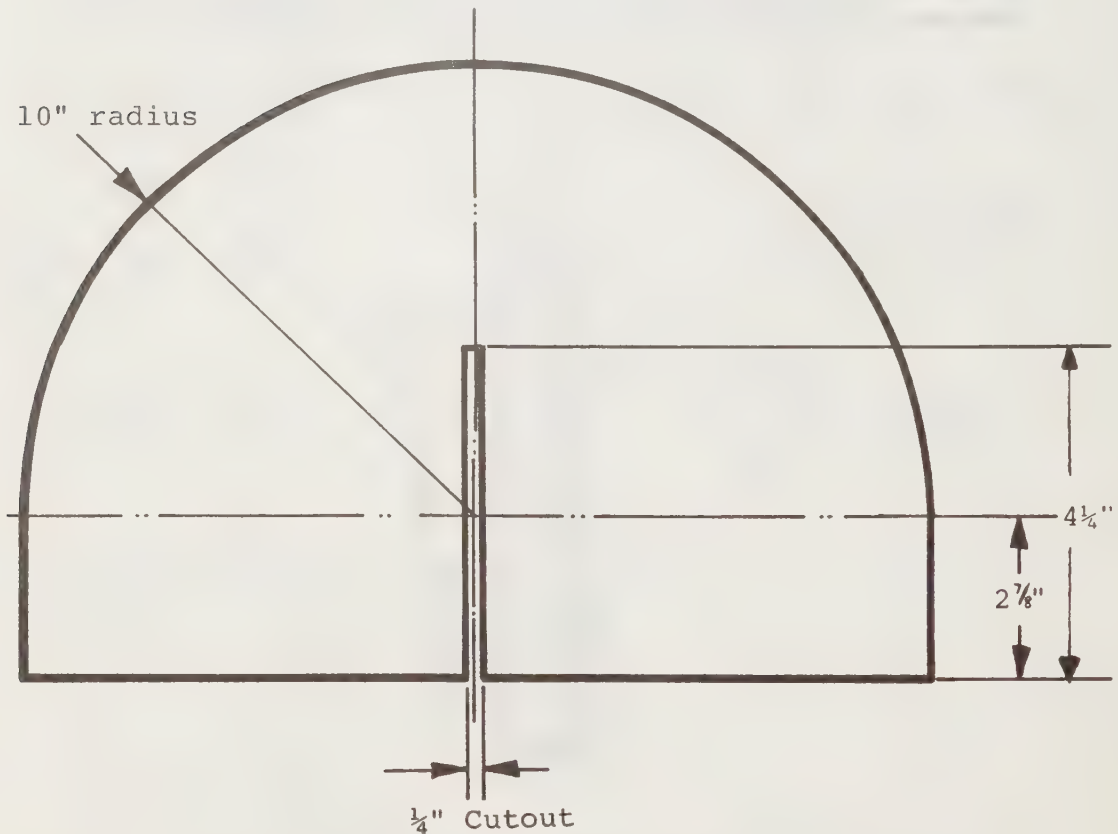


Figure 1d
Bliss symbol mount 3/64" cardboard

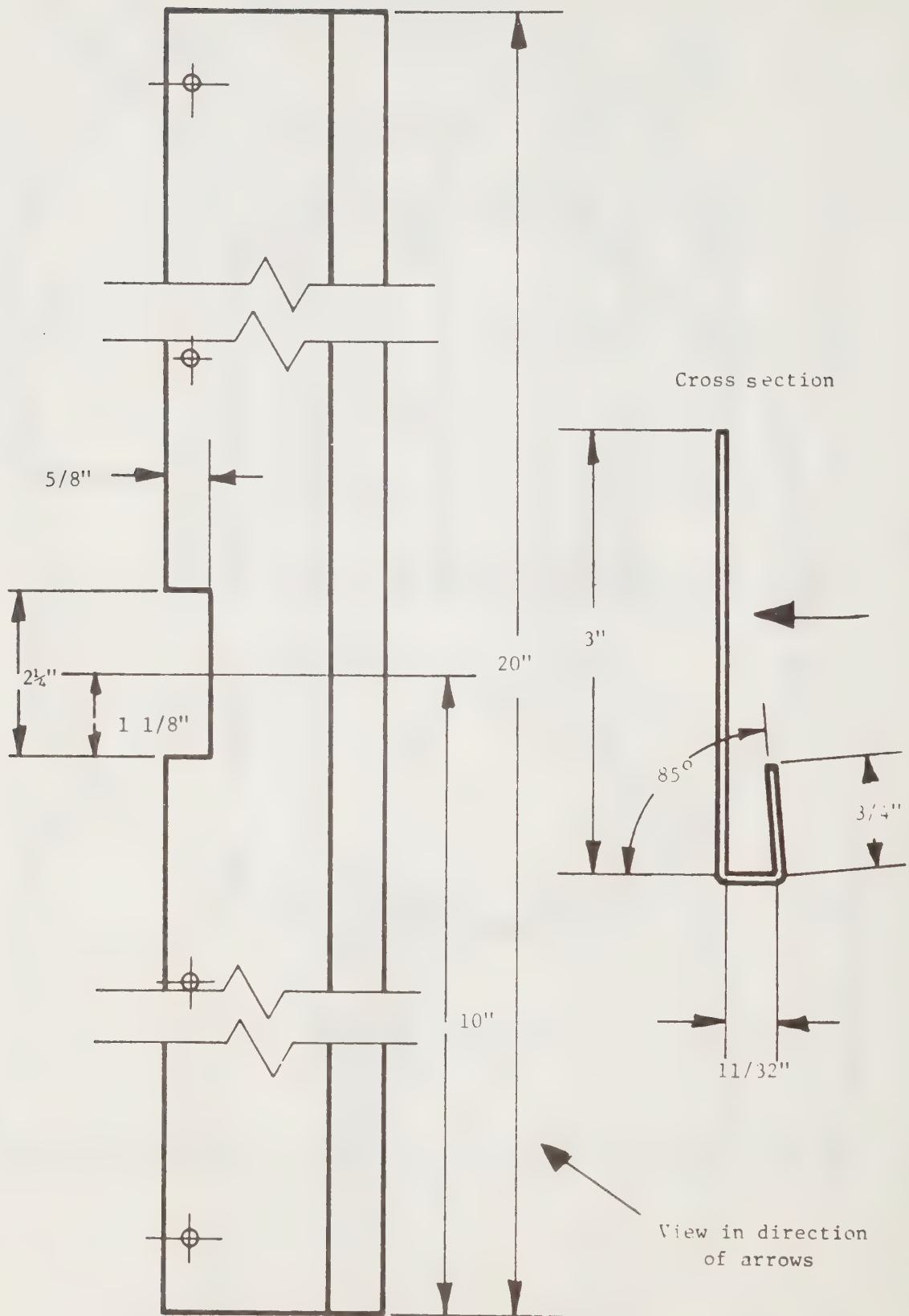


Fig. 1f Holder (1/32" aluminum)

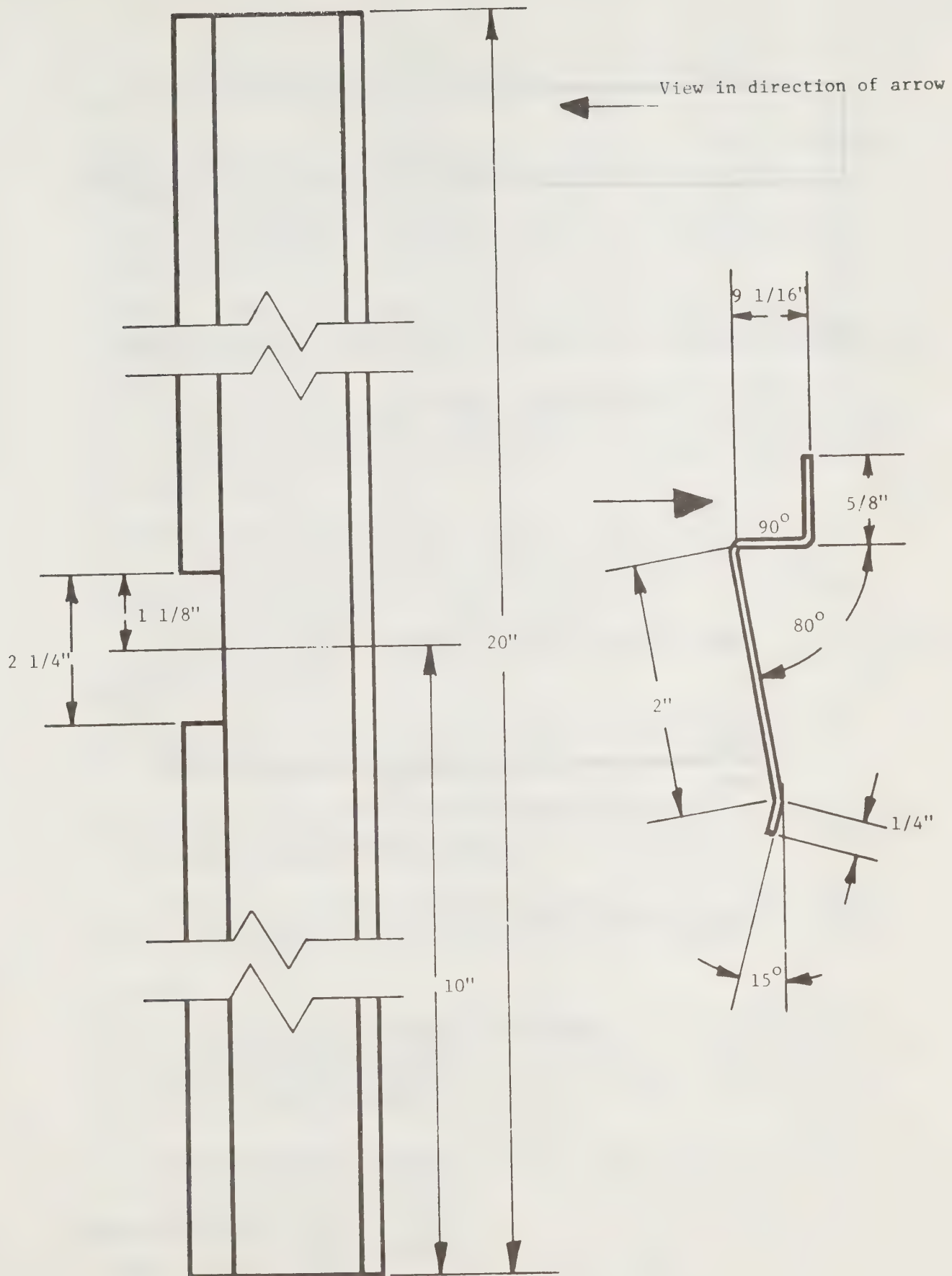


Fig. 1a Trav clip (1/32" Aluminum)

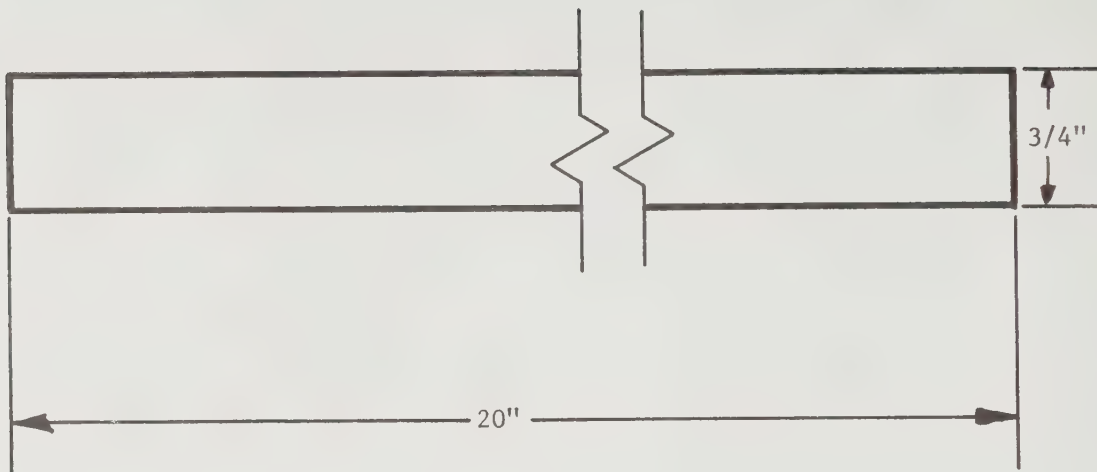


Fig 1h Spacer ($3/32''$ Aluminum)

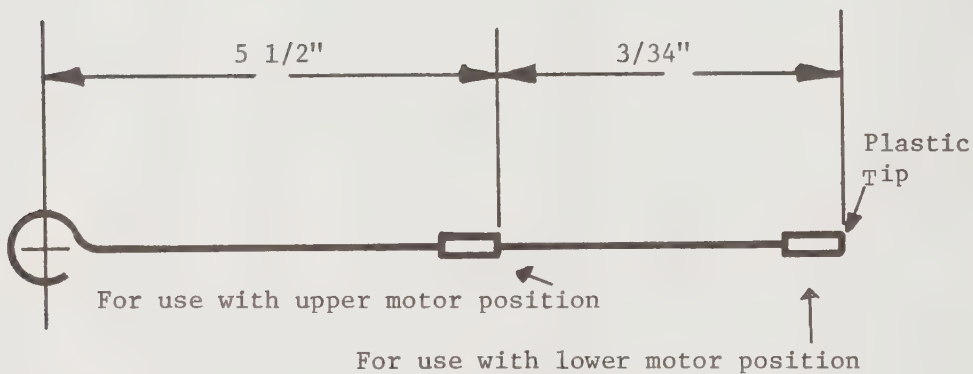


Fig. 1i Pointer ($3/64''$ Brass, Copper or Aluminum)

Fig. 1a-1i submitted by:
 B.C.F. Resource Centre
 Ottawa Crippled Children's
 Treatment Centre
 and
 National Research Council
 of Canada
 Medical Engineering Section
 Division of Electrical Engineering
 Ottawa, Ontario

ASSEMBLY OF MECHANO-ELECTRICAL COMMUNICATION BOARD TYPE TM (TRAY MOUNTING)

Assemble the board as per drawings. NOTE that some pieces are aluminum while others are wood or plastic.

The aluminum bracket is designed to fit a tray with a 1/2 inch by 3 inch high back board. Take care that screws are countersunk into the front of the wood face.

Determine whether the motor should be mounted at the centre of the board for one direction use, or near the bottom for two direction use and mount on the board with 4-40 flat head machine screws.

Cut the pointer from 1/8 inch brass, aluminum or copper wire. Form a loop at one end for fastening to the motor shaft adapter, which should be purchased with the motor. Cut to proper length after assembly. A coloured plastic on the end of the pointer helps the child to see it.

Battery holder modification: Grasp the tabs that would normally contact the motor terminals and bend up and down to break them off. NOTE: break either one but not both if motor will be controlled in one direction only. Break both if two directions will be controlled.

Place battery holder on the back of the motor. It will snap into position one way only.

Single direction control: Solder an insulated wire on the free terminal of the motor. Another wire is soldered to the end of the brass strip where it is riveted.

Two direction control: Solder wires to both motor terminals and both brass strips at the rivets. It helps if the wires are of different colours for connection to the control.

When control is assembled, batteries can be installed. NOTE arrows on holder. It is advantageous to tape the batteries around the holder to help maintain a proper contact:

Controls

A variety of controls can be made up to suit the child. The motor current is very low so that any low power switch can be used. An electronics parts store is a good source of supply. For single direction, use a single pole, single throw switch. See attached sketches.

For two direction, use a double pole, double throw, centre off, spring return to centre. See attached sketches.

MOTORS from Hanksraft (Canada), Ajax, Ontario

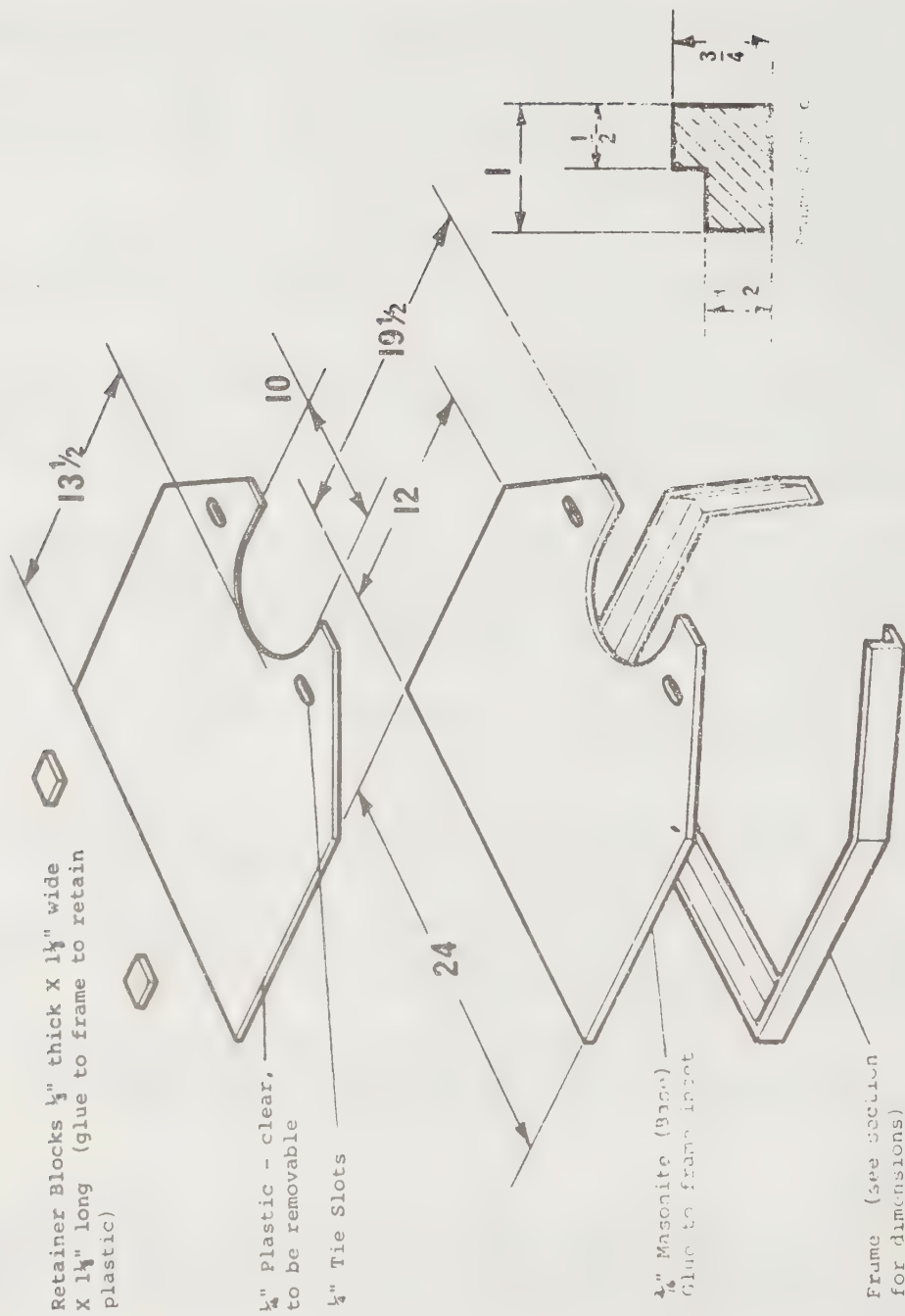


Fig. 2 BLISSYMBOL BOARD

Keith Boysenchen School
12345 Fresno,
Wal 1, Michigan 48139

30. BLISS LAPBOARD (tilting plexiglass)

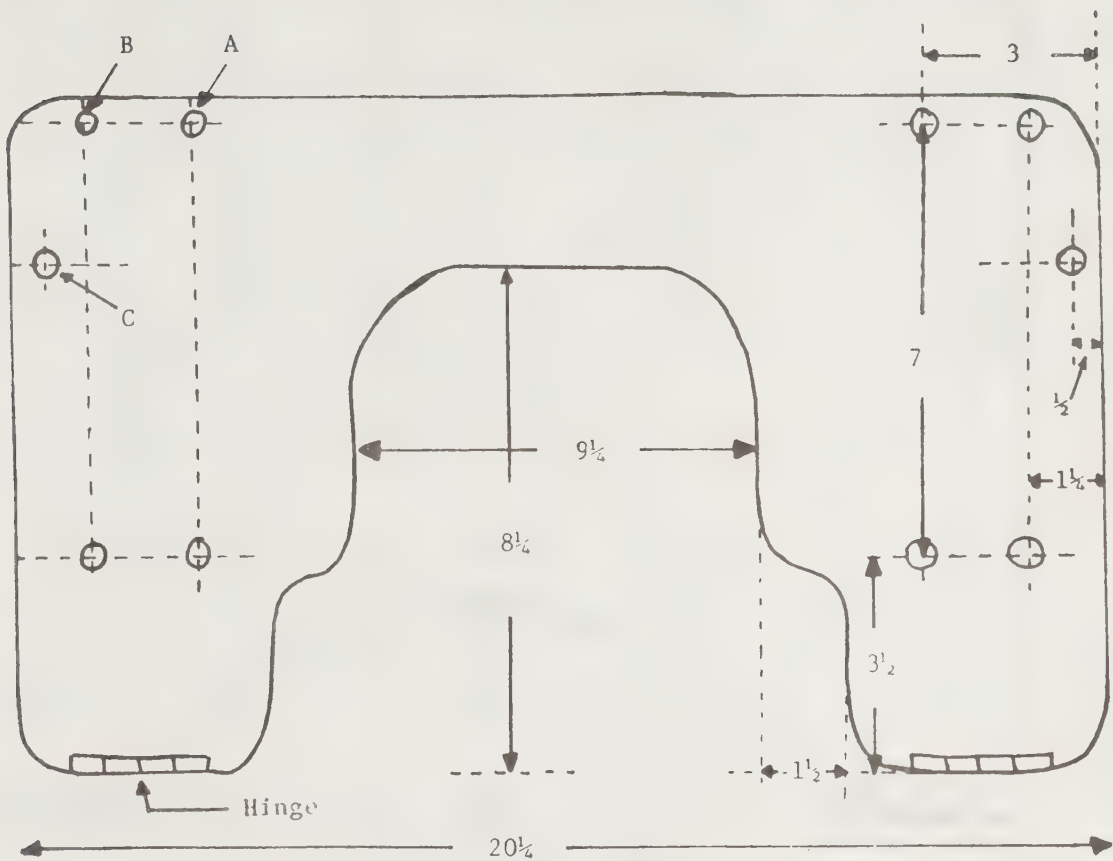
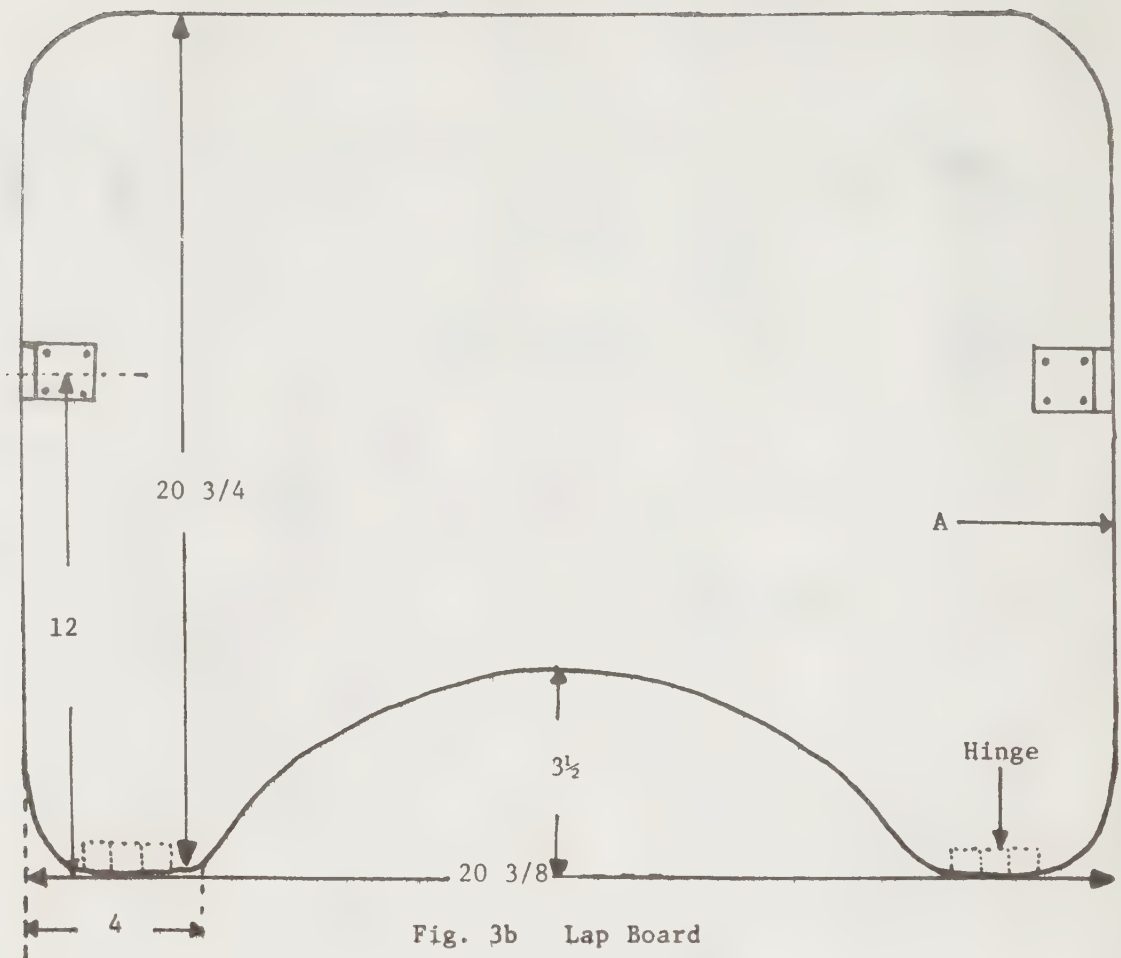


Fig. 3a Fixed Board

Specifications:

- (a) 10 holes for 10-24NC 'T' nuts.
- (b) Material: $\frac{1}{2}$ " plywood.
- (c) 'A': Recess 10" x 1" x $\frac{3}{32}$ " for wheelchair.
- (d) 'B': Shim $\frac{1}{16}$ " for walker.
- (e) 'C': For part #3e.

Scale: 1" = 3"



Specifications:

- (a) Material: $\frac{1}{2}$ " plywood.
- (b) 'A': Edging all around.
- (c) Acrylic sheet required to fit inside edging and cover Bliss board.

Scale: 1" = 3"



Fig. 3c. (2 required)

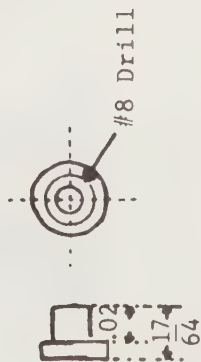


Fig. 3d. (2 required)

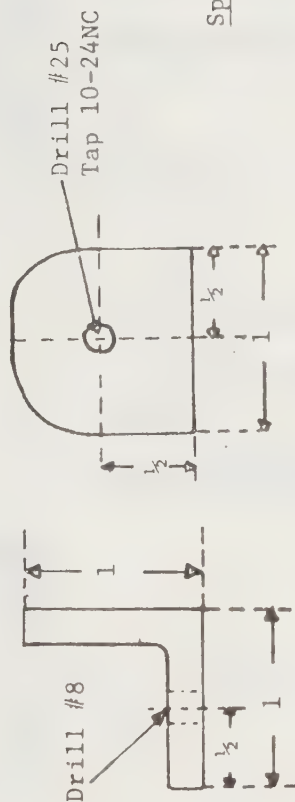


Fig. 3e. (2 required)

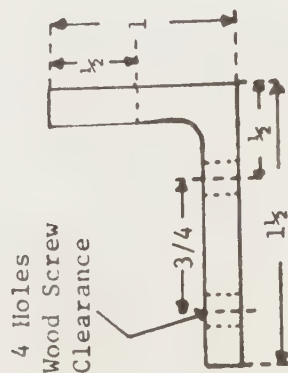


Fig. 3f. (2 required)

Specifications:

- (a) Parts 3c,e,f plated steel $\frac{3}{16}$ thick.
- (b) Part 3d steel.
- (c) Part 3e braze 10-24 stud for locking knob.

Scale: full size

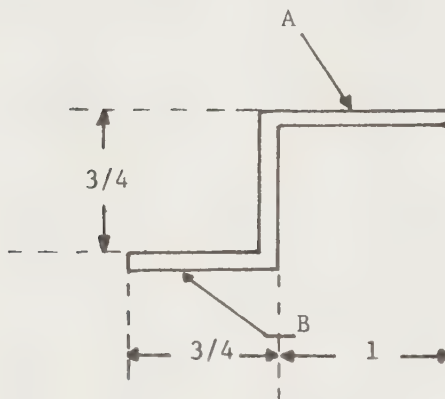
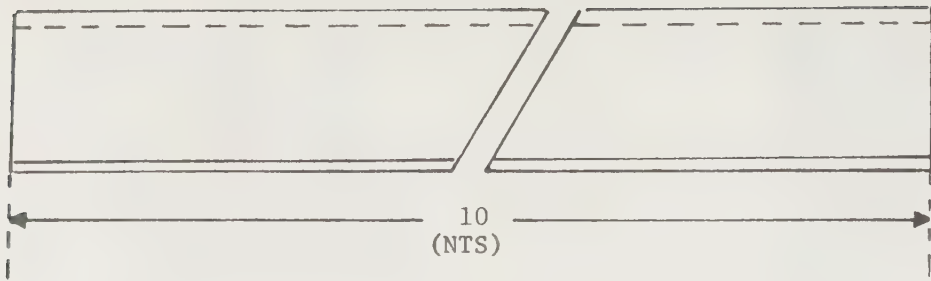


Fig. 3g (4 required)

Specifications:

- (a) Drill 2 holes #8 Drill, 7" centres.
Two (2) parts with holes at A ,
2 with holes at B .
- (b) Material: Anodized aluminium.

30 submitted by:
Mr. Jack Heath
Technical Supervisor
Rehabilitation Engineering Dept.
Rehabilitation Centre
Health Sciences Centre
Winnipeg, Manitoba

31. INTERFACE

For the child who is unable to finger point or fist point, an interface may prove useful.



(finger point)



(fist point)

#31 submitted by:
Mrs. Margaret Beesley
Ontario Crippled Children's
Centre
Toronto, Ontario

APPENDIX 4

INTERFACES

Pages 287 - 309

A. GLOSSARY OF INPUT INTERFACES

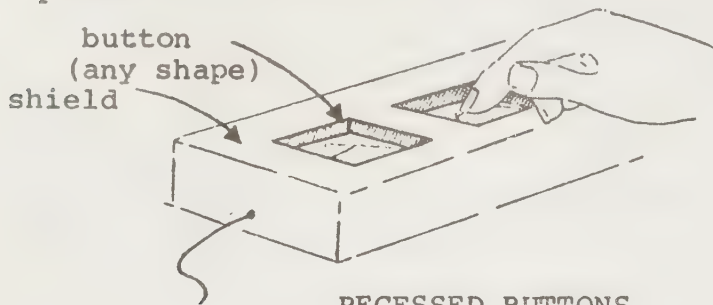
MECHANICAL SWITCHES FOR THE EXTREMITIES - fingers, hands, elbows and feet. (Many can also be used with a headstick.)

Sub-types: h - intended for fingers or hands
f - intended for feet
t - intended for tongue

(a) PUSH BUTTONS: There is a very wide variety of shapes and sizes. Two special types are noted:

Ak - Keyboard-style buttons, similar to those found on an ordinary electric typewriter.

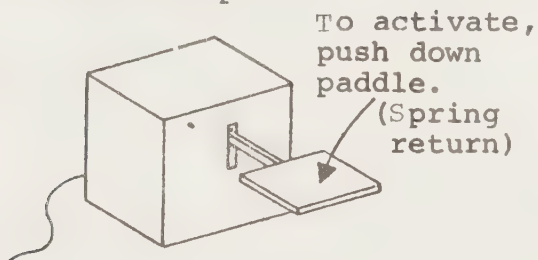
Ar - Recessed (shielded, guarded) buttons. The "shield" helps prevent accidental activation of buttons.



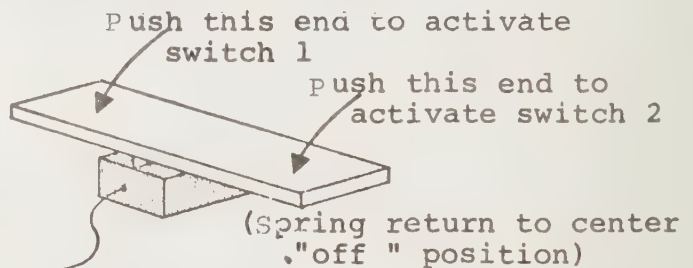
RECESSED BUTTONS

(b) PADDLES AND LEVERS - There are many shapes and sizes.

For example:



PADDLE SWITCH

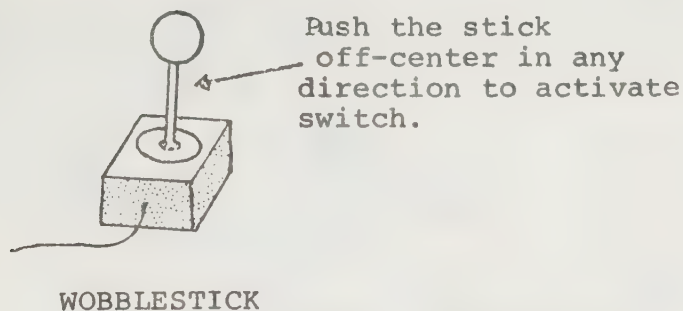


SEE-SAW ROCKING LEVER
(2 switches)

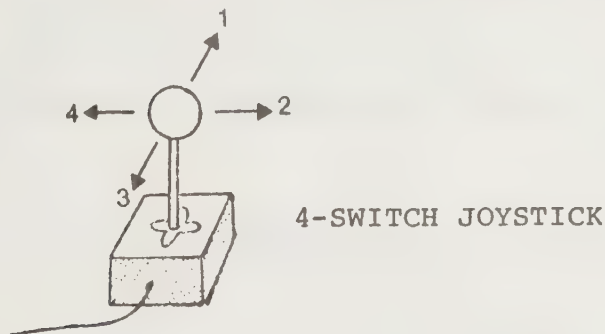
(c) PILLOW SWITCH: Punch a "pillow" or pad to activate the switch.

MECHANICAL SWITCHES FOR THE EXTREMITIES (cont'd)

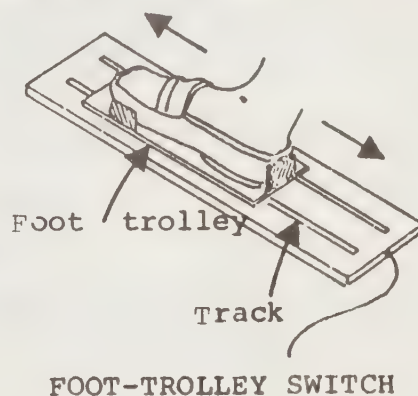
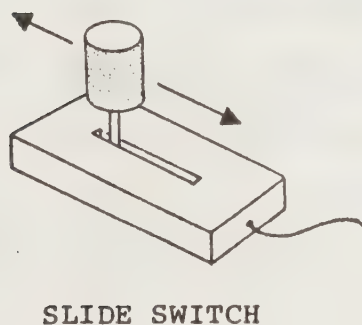
- (d) WOBBLESTICK: (Possum Controls Ltd.)



- (e) JOYSTICK: Multiple switches are operated by one control stick. In general, 2 to 8 switches are incorporated.



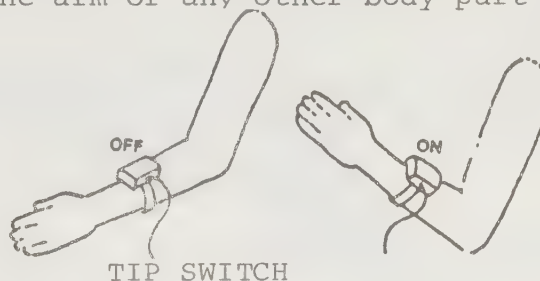
- (f) SLIDING OR TROLLEY SWITCHES: Switching is accomplished by motion along a slide, groove, or track. These switches usually have 2 positions ("on" at one end, "off" at the other) or three positions (one switch at each end, "off" in the middle).



- (g) POKE SWITCHES: Activated by poking a pointer in a hole or indentation (PMV "Minimum").

MECHANICAL SWITCHES FOR THE EXTREMITIES (cont.)

- H. TIP OR TILT SWITCHES - Tilted one way the switch is "off", tilted the other way it is "on." The switch would be strapped to the arm or any other body part which can be tilted.

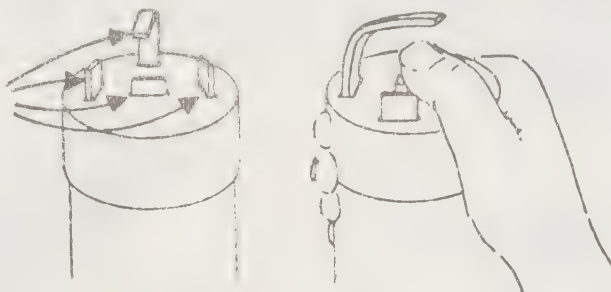


TIP SWITCH

MECHANICAL SWITCHES FOR A SPECIFIC BODY PART

- K. These switches are fitted to a specific body part and are activated by a particular motion.
- Ka - Head switch. Activate by lateral (side to side) head motion. ("Tic"-Tuft's Interactive Communicator)
 - Kc - Chin switch. Squeeze switch between chin and chest.
 - Ke - Eyebrow switch. Raise eyebrows. (Veteran's Administration, "speakeasy")
 - Kn - Knee switch.
 - Kp - Palate switch. Press tongue up against switch molded to fit in the palate.
 - Ks - Splint switches. A molded hand splint with miniature paddle switches mounted above or below the fingers. (Possum Controls Ltd.)
 - Kt - Tongue switch-lever operated by the tongue.
 - Kv - Thumb switch. (Fairchild-Hiller, "Viewcom".)

4 switches

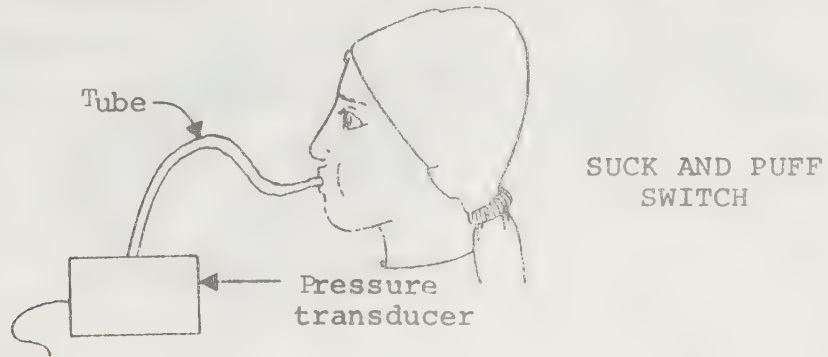


THUMB SWITCH

- Kw - Wrist switch, Rotate wrist. ("Tic": Tuft's Interactive Communicator)

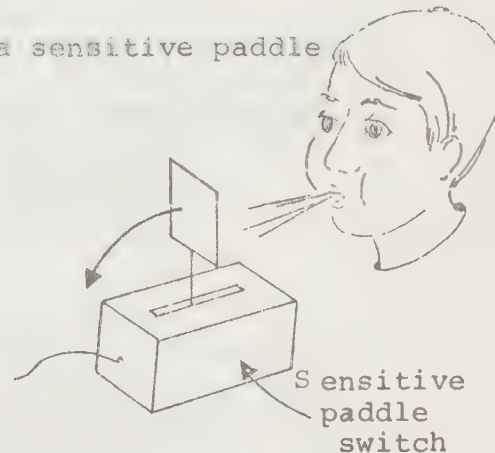
PNEUMATIC SWITCHES

- (1) SUCK AND PUFF: The switch is operated by very small pressure changes in the tube. Mouth control rather than respiratory control, is usually sufficient to operate this switch.



- (m) AIR PADDLES: Activated by blowing at a sensitive paddle switch.

AIR PADDLE



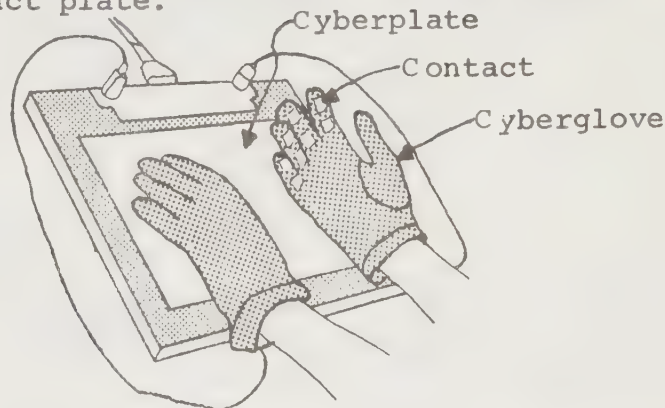
TOUCH SWITCHES These require contact, but no physical pressure.

- (n) TOUCH-PLATE: Activated by touching a prescribed sensor area with any skin surface.

Nt - Designed for use with the tongue.

TOUCH SWITCHES (cont'd)

- (p) CYBERGLOVE AND CYBERPLATE: (Cybernetics Research Institute)
Gloves with contacts on the fingers are touched to a metal contact plate.



CYBERGLOVE AND CYBERPLATE

MOISTURE SENSITIVE SWITCHES

- (q) MOISTURE SWITCH: Activated by contact with the tongue.
A moisture sensitive switch will not be activated by contact with dry skin.

PROXIMITY SWITCHES

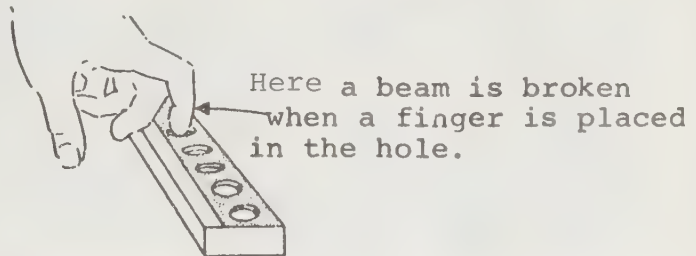
- (r) PROXIMITY SWITCH SENSITIVE TO BODY Activated when a body part is brought within a certain range of the switch.
- (s) PROXIMITY SWITCH SENSITIVE TO A SPECIAL TRIGGER ELEMENT:
Activated when a special object (metal, magnet, circuit, etc.) is brought within a certain range of the switch.

OPTICAL

- (t) LIGHTSPOT: The beam from a light source (attached to the head or some other body part) is used to operate photosensitive switches on a panel in front of the user. The user can see the lightspot on the panel and maneuver it to the desired photosensor.

OPTICAL SWITCHES (cont'd)

- (u) INTERRUPTED-BEAM SWITCH: Activated whenever a beam of light is interrupted (by a finger or some other body part).



INTERRUPTED-BEAM SWITCH

SONIC SWITCHES Activated by sound

- (x) WHISTLE SWITCH: The switch is activated by the sound of an ultrasonic dog whistle. The whistle can be blown by punching a rubber bulb connected to its mouthpiece. With this type of switch, no physical connection is needed between the user and the communication aid. ("Tic": Tufts Interactive Communicator)

BIOELECTRIC SWITCHES Activated by the electrical impulses generated in nerves and muscles of the body.

- (y) MYOELECTRIC SWITCH: Electrodes are applied to the skin near a controllable muscle group. Contraction of the muscles produces electrical signals which are detected by the electrodes and used to activate the switch.

Section A submitted by:

Greg Vanderheiden &
 Mary Jo Luster
 Cerebral Palsy Communication
 Group
 University of Wisconsin
 Madison, Wisconsin

B. Pointer Board

The pointer starts continuous rotation, when a switch closes an electric circuit, and stops at release of the switch. The model has the simplest possible configuration, with one sense of rotation only (clockwise or counterclockwise, depending on connection to battery). It features a steel surface, permitting use of magnetic chips with symbols etc. Pointer stops instantaneously at release of the switch, avoiding overrunning of the target. (Directions follow).

CONSTRUCTION DETAILS

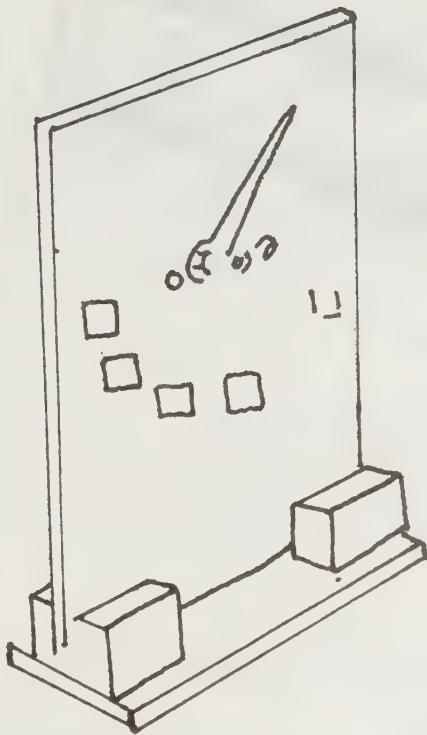
Vertical board composed of 1/8 inch hardboard (Masonite) and a sheet of galvanized steel 1/32 inch thick (attached to front surface), size: 20 inches wide, 30 inches high, mounted on a wooden base for operation on table top.

Pointer, 8 inches long, mounted on output shaft of pointer drive, 10 inches from top of the board.

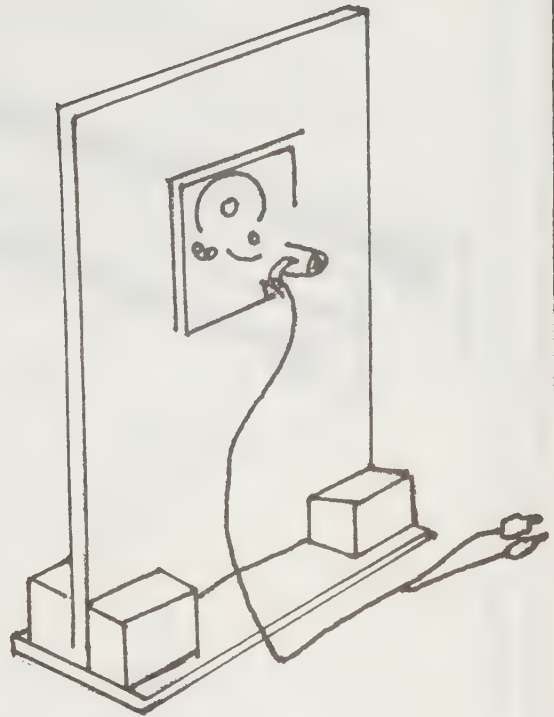
Pointer drive consists of a small battery-powered motor which drives the pointer through a gear train. One full revolution of the output shaft takes approximately 10 seconds.

Battery is composed of three "D" cells (flash-light batteries).

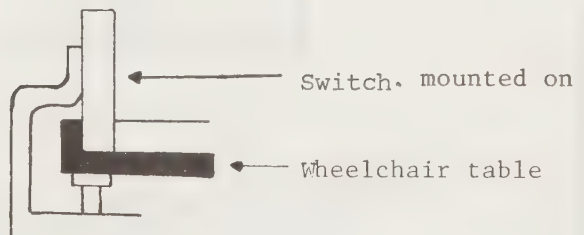
Switch is single pole, normally open, contact. Physically, it is a flat panel in a plastic sheet envelope (to keep dust and dirt out). Mounted with a clamp to the left or right side of the wheelchair table in a vertical plane, it requires only a small-force touch at any point of the rigid front plane of the switch.

POINTER BOARD

Front View



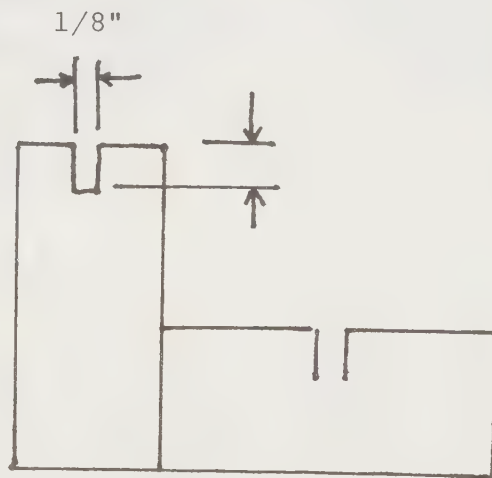
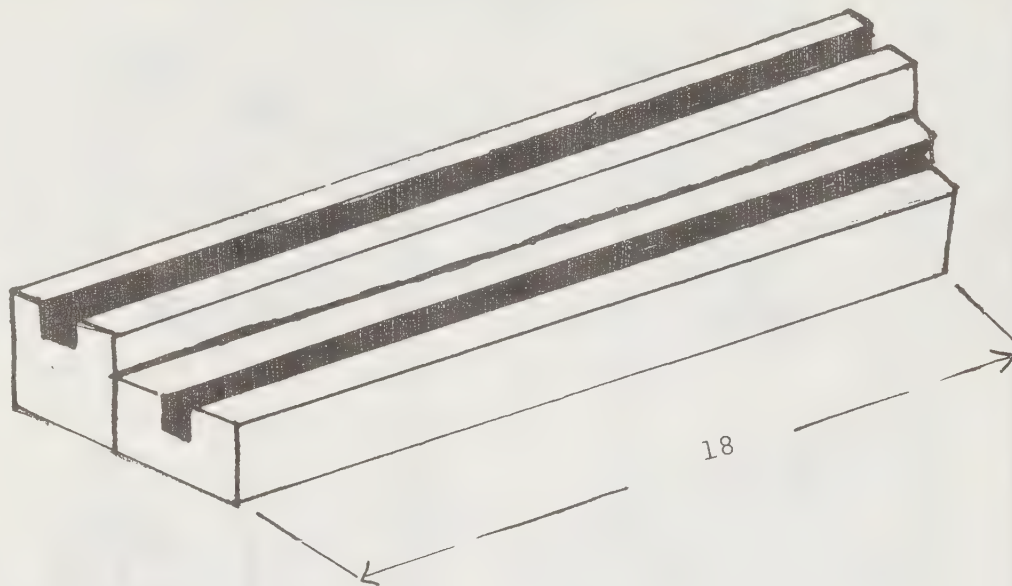
Rear View



Side View

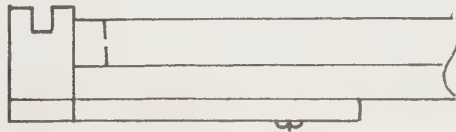
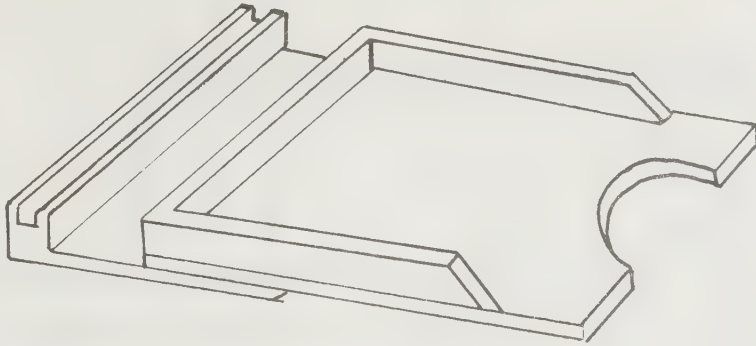
Switch, mounted on

Wheelchair table

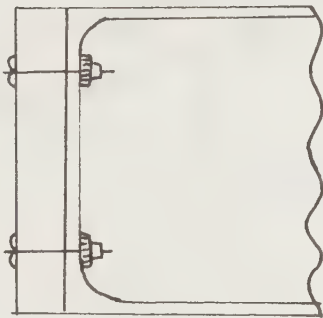
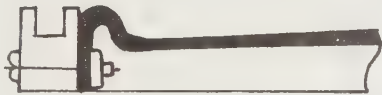


DISPLAY STICK

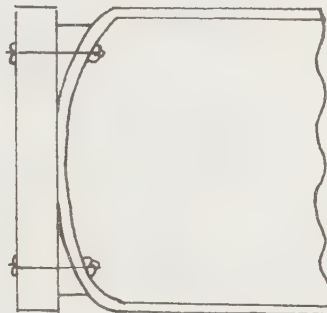
2 Lengths of pine 1 x 2 x 18 long
with saw cuts $1/8$ wide and $1/4$ deep,
glued together.



DISPLAY STICK, attached to wooden table



A



B

DISPLAY STICK, attached to plastic wheelchair table

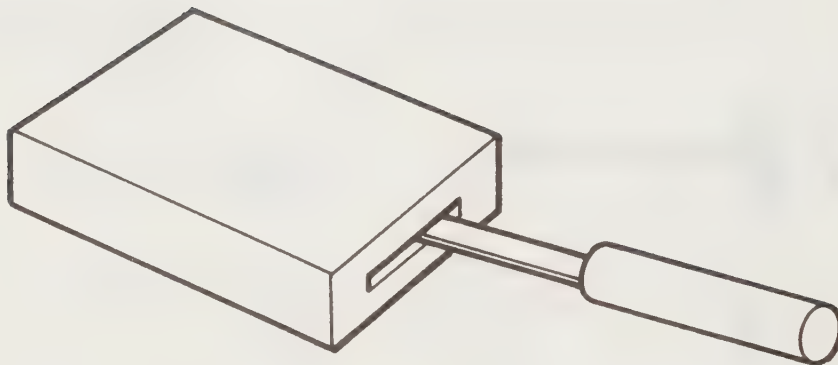
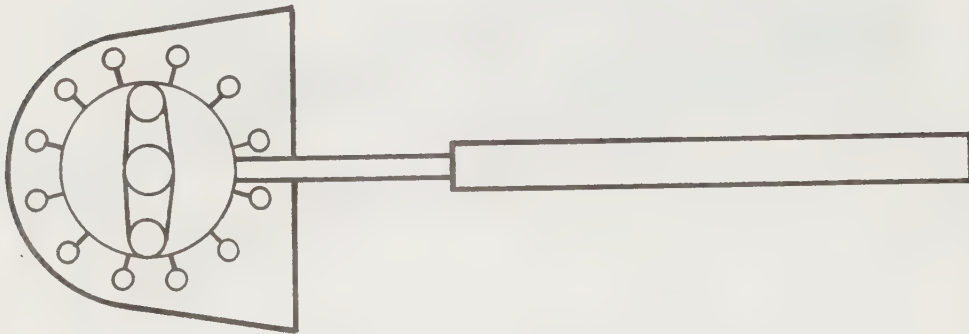
A with straight front edge

B with curved front edge, requires spacers

b) submitted by:

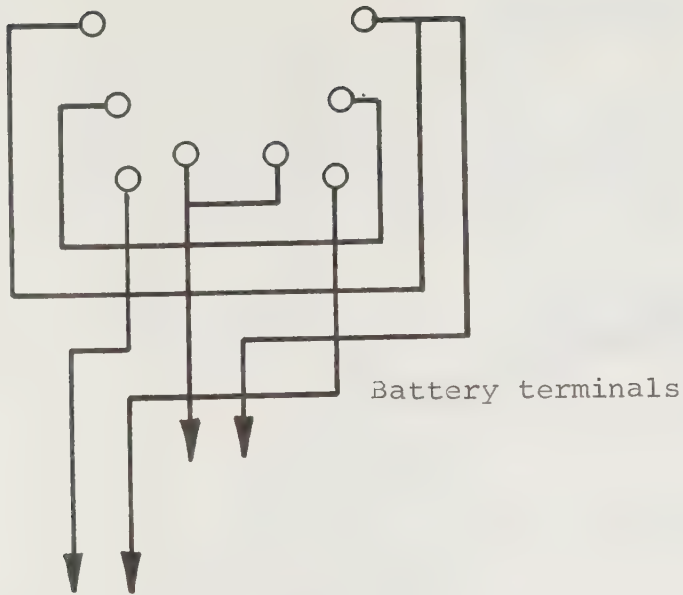
Hans Boer
Peter Hall School
Montreal, Quebec

C. Horizontal Dual Direction Control



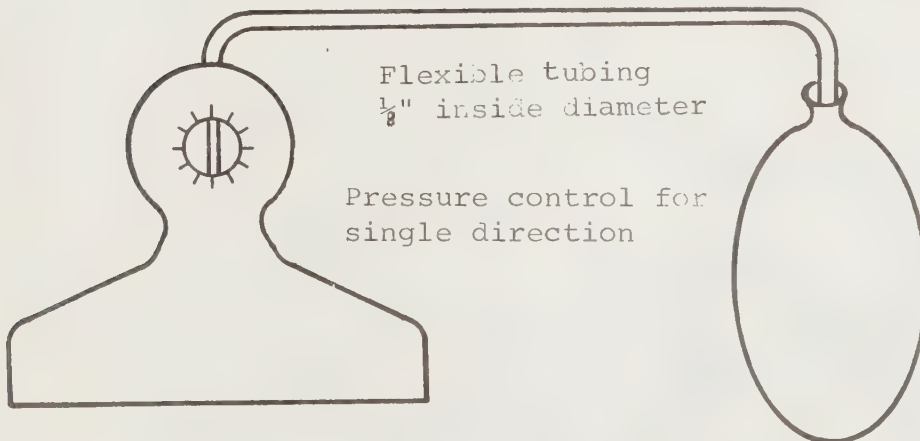
Wiring Drawing - Looking at
top of switch

Use Switch #V-SRL 74031N
JBT Instrument Inc.,
available from Prelco
Electronics Ottawa/Toronto



Motor terminals

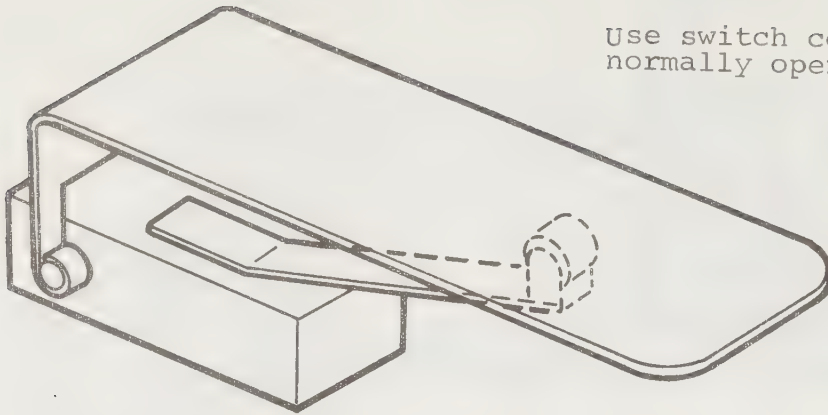
This control switch should be mounted in a box attached to back of board



Rubber balloon, slightly inflated can be placed in beanbag or cloth doll

Air wave switch type DW20
Model AW. Tape Switch Corp.
of America, 320 Broad Hollow Rd.
Farmingdale, N.Y. 11735
516-694-6312
Cost Price App. \$20.00

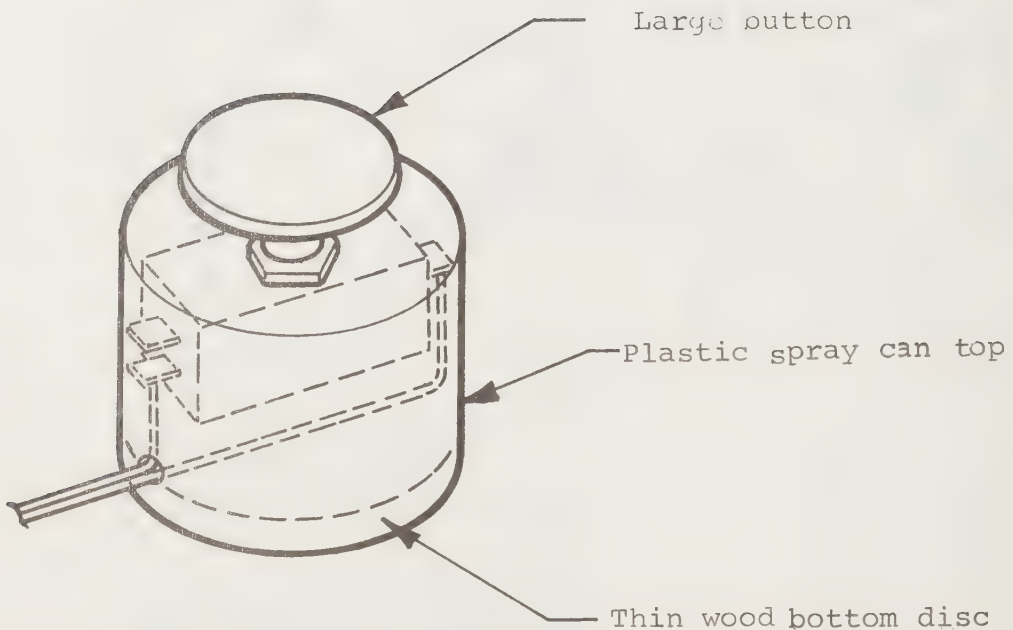
Use switch contacts marked
normally open and common



Paddle control for
signal direction

Switch Type: Microswitch #BZ-2RL2
(Wackids, Ottawa)

OR: Morse Code Key available
from Hobby House



Single directional control

SWITCH: Cherry #E13-00J
Henry Daymond Sales
262 Kerr Street,
Oakville, Ontario

D. Hand Paddle

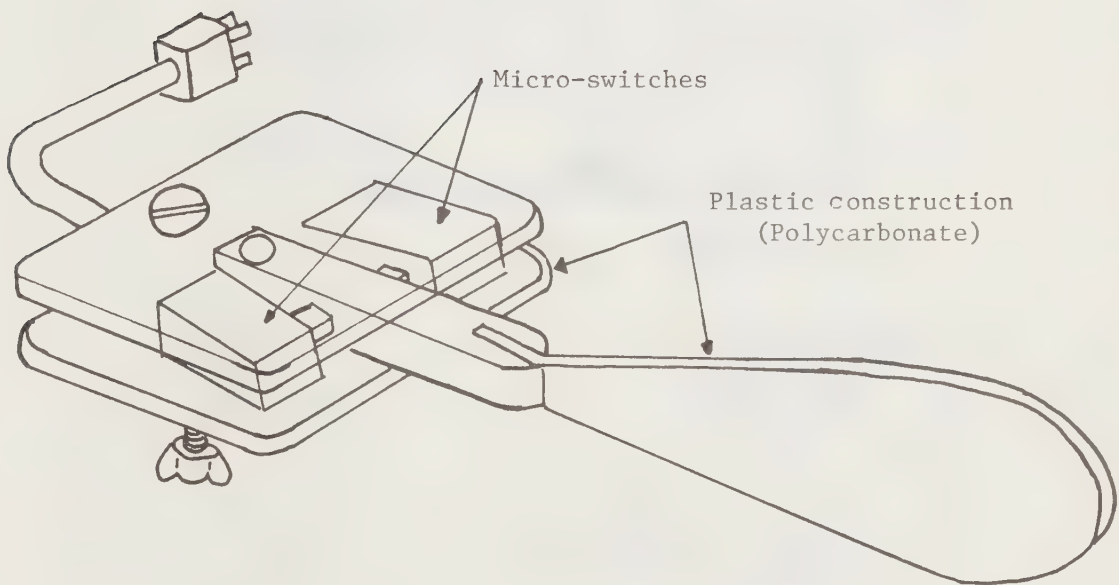
This is a modified version of the horizontal toggle switch. The complete switch is manufactured from a tough flexible plastic that is virtually non-destructible and uses micro-switches in place of the toggle switch.

ADVANTAGES:

- (a) It is more easily constructed and hence cheaper;
- (b) It uses cheaper components;
- (c) It is difficult to break hence requires virtually no maintenance;
- (d) It can be operated without the child lifting his hand from the tray surface.

DISADVANTAGES:

- (a) It occupies excessive space on the child's tray;
- (b) It is limited to only two functions.



E. Joystick #1

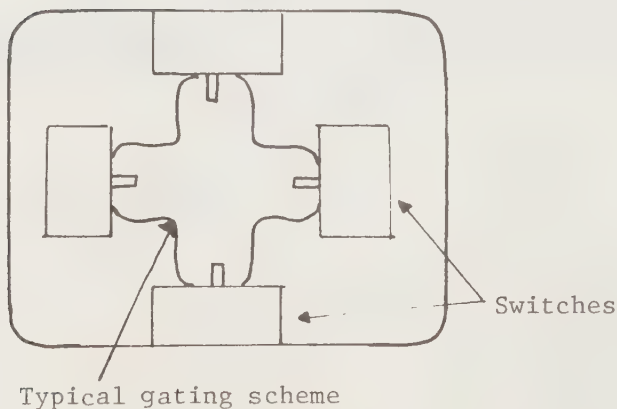
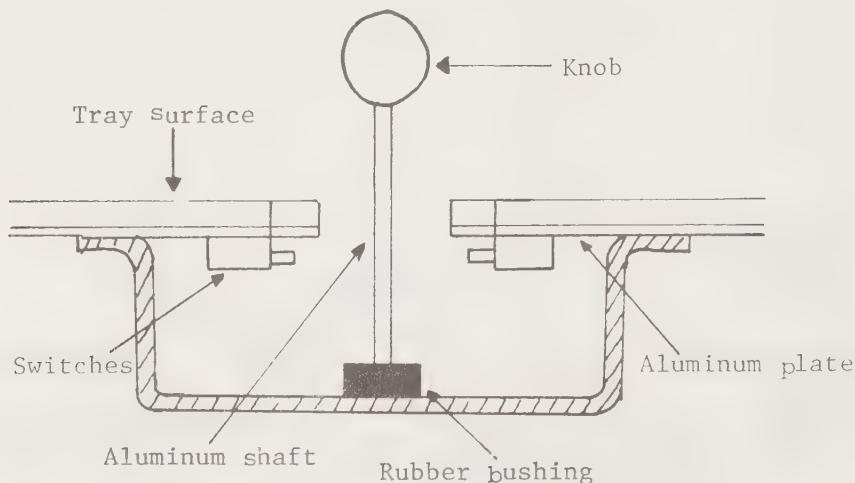
This consists of a rubber bushing, plastic vacuum formed housing, metal plate and stick, plastic knob and four micro-switches. The metal plate can be cut to give any particular form of gating required. The rubber bushing provides a certain amount of damping for the child's erratic movements.

ADVANTAGES:

- (a) It is easily fabricated hence relatively inexpensive;
- (b) very durable;
- (c) It provides mechanical damping and gating;
- (d) Upon release it returns to a central position;
- (e) The size and shape of knob is variable;
- (f) It fits neatly beneath a child's tray, without interfering with his legs.

DISADVANTAGES:

- (a) The flexibility of the rubber bushing cannot be changed; this results in a fairly stiff joystick;
- (b) It has to be fixed to the child's wheelchair or tray hence its use is limited.



F. Joystick #2

This is fabricated in the same manner as joystick #1. It is unique only in that its gating scheme permits this interface to control both on electric wheelchair as well as on electronic symbol display.

The diamond shape of the gating combined with the square cross-section of the joystick enable the severely involved child to activate either two switches at once or one switch at a time by relatively gross movements (see figure 1). This is necessary to control any of the more commonly available electric wheelchairs.

ADVANTAGES:

- (a) It eliminates the fine co-ordination required to utilize the non-gated joystick;
- (b) It can be used to control a display in at least four different functions;
- (c) The gating can be modified to reduce the required co-ordination even further (see Figure 2);
- (d) See joystick #1.

DISADVANTAGES:

- (a) It is not easily mountable on a wheelchair alone (i.e. without tray).
- (b) See joystick #1.

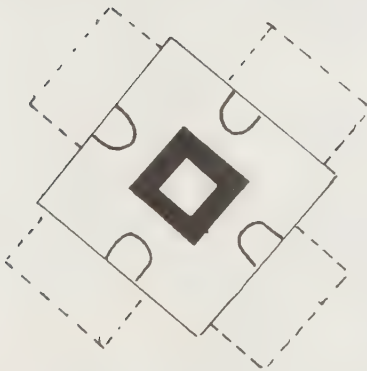


Fig. 1

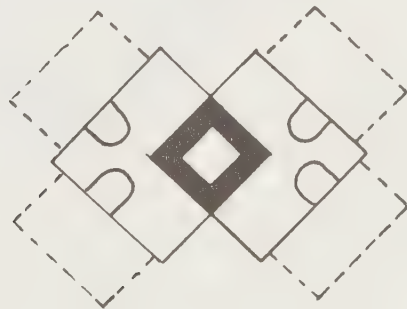


Fig. 2

G. Overhead Joystick

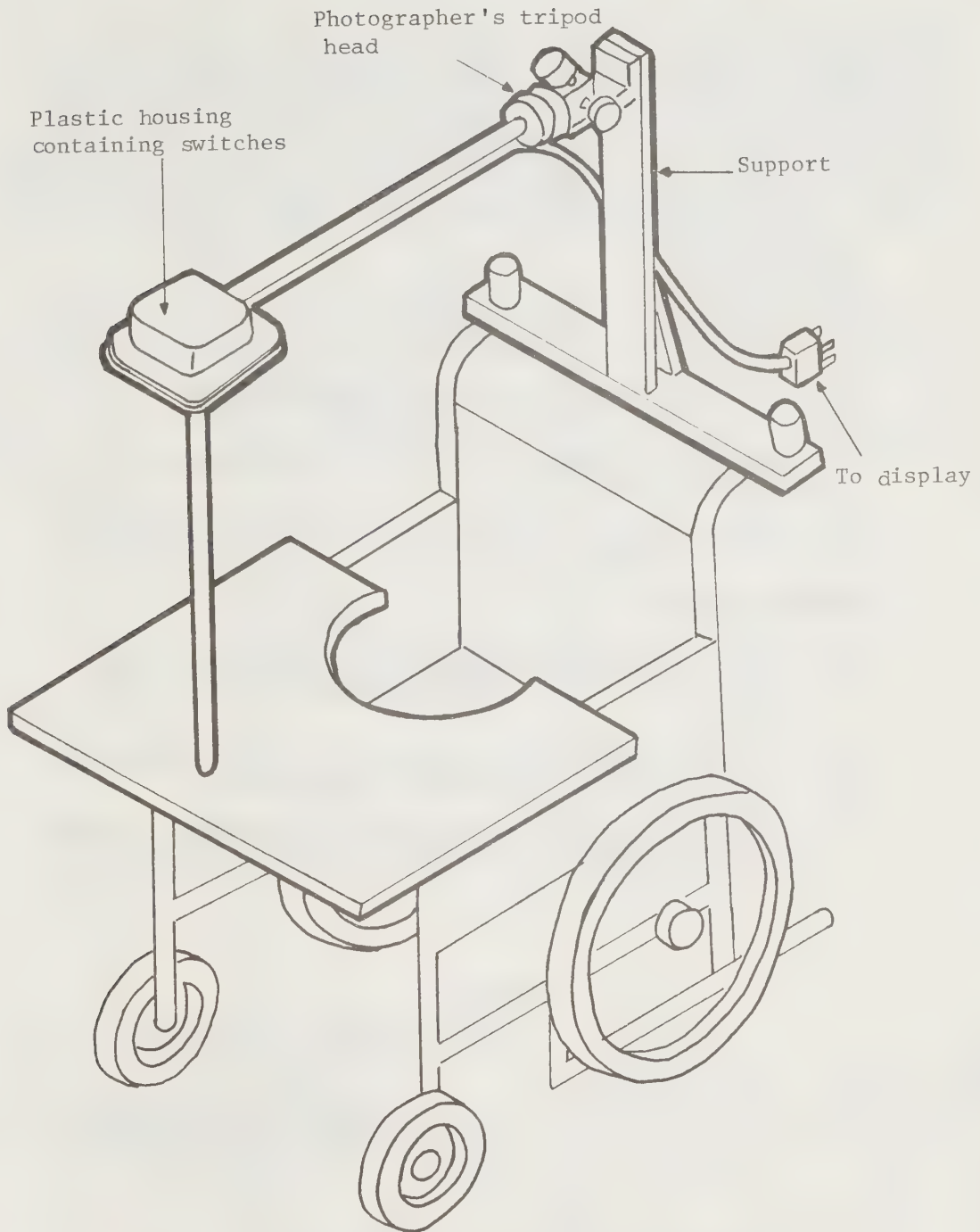
This has the same basic construction as the joystick except that it is held upside down over the child (see picture). This particular unit has been designed to incorporate the head of a photographer's tripod making it very adjustable. It is a prototype unit and was designed to fit as many children as possible. By placing the joystick in this fashion one can accommodate a wide variety of large gross unco-ordinated movements. The bottom of the joystick is also fitted with a holder for crayons, marking pens, etc. enabling the child to draw to a limited extent.

ADVANTAGES:

- (a) It is suitable for the very handicapped unco-ordinated child;
- (b) The length of the suspended rod provides a mechanical advantage for gross shoulder movements. The free swinging rod also provides a larger number of possible contacts along its length than the normal joystick;
- (c) Like any joystick it can perform a minimum of four functions;
- (d) It can also be used for other activities (e.g. drawing, painting) to compensate for the lack of fine hand skills.

DISADVANTAGES:

- (a) It is relatively complex, hence expensive;
- (b) It is cumbersome in appearance; requires frequent manipulation, as the child is taken in and out of the chair.

OVERHEAD JOYSTICK

Shows mounting of overhead joystick on wheelchair.

H. Flat Surface Switch

This consists of a plastic flap which when depressed activates a micro-switch. This approach is particularly suited for modifying the trays constructed at this centre since they already have a plastic covering of one eighth inch polycarbonate. This means that a flap can be cut from the tray itself. If this is done properly one is left with a flat flush surface which has one or more sensitive areas.

ADVANTAGES:

- (a) Because it is flush with the tray's surface it doesn't get in the way of other activities;
- (b) The sensitivity can be adjusted so that only a very light touch is required;
- (c) The device can be operated by the hand, foot, or head stick;
- (d) The surface can be a large variety of shapes and textures.

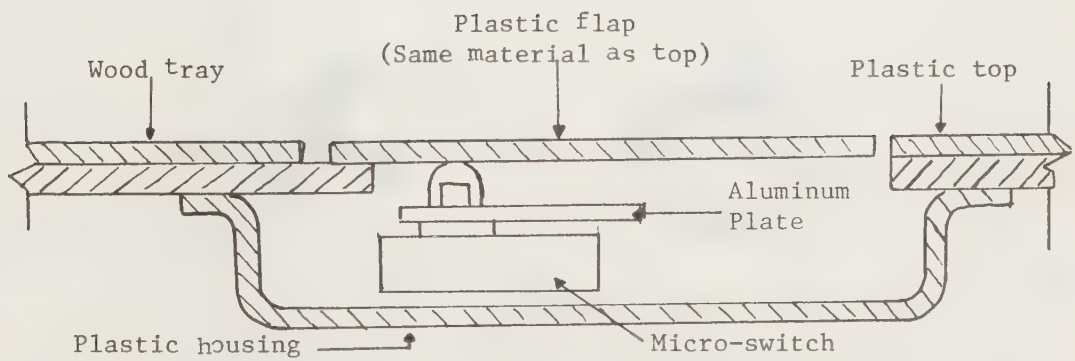
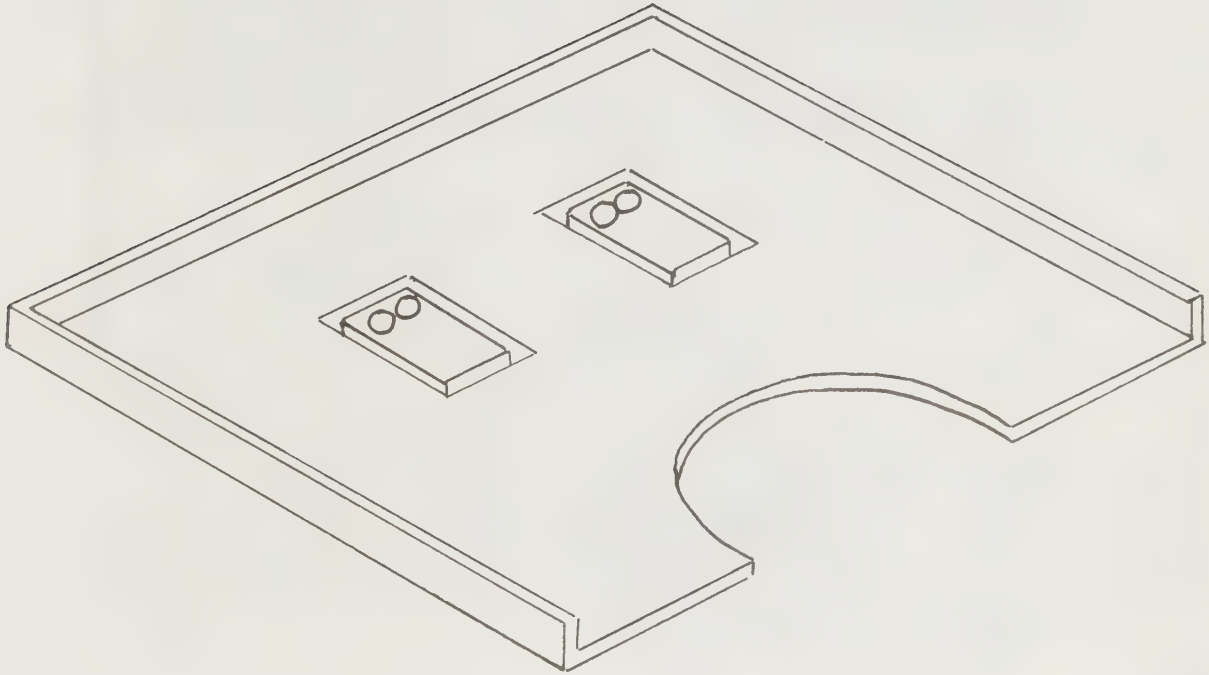
DISADVANTAGES:

- (a) Liquid and food tend to get under the flap, especially when it is incorporated into the tray;
- (b) Incorporation into a tray is a difficult, time consuming task and hence expensive;
- (c) Like other tray or wheelchair mounted switches, it can be used only when the child is in his wheelchair.

(c)-(h) submitted by:

Ontario Crippled Children's
Centre

Symbol Communication Program
Year End Report, 1974

FLAT SURFACE SWITCH

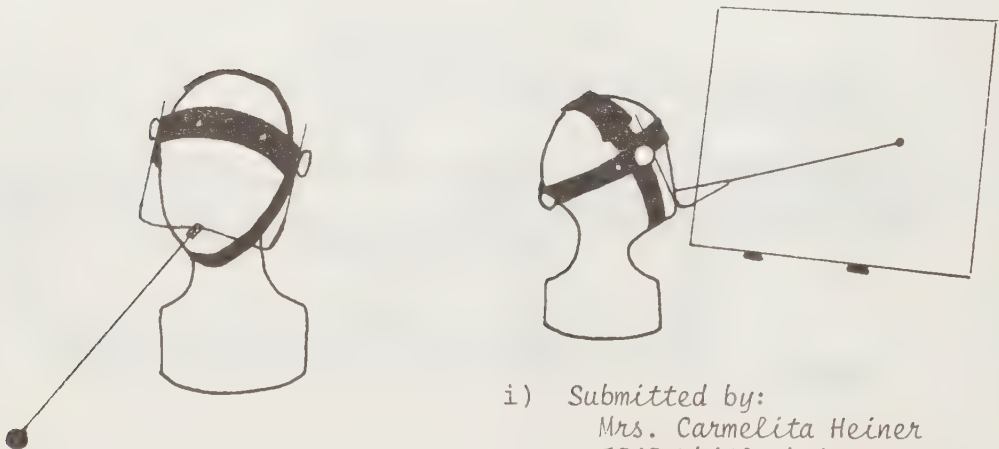
I. Head Mounted Wand

This is a light weight, universally adjustable headpiece consisting of a horizontally oriented plastic head band that is padded and adjusts to any head size by a single knob located at the back. On either side of the band, at the temporal area is a stud that keeps two leather straps: one going over the top of the head (held by velcro sewn on the under side of the straps), the other straps going under the jaw (securing in the same manner).

On the same temporal studs is (1) a bracket which accepts an aluminum face yoke fitted with a socket at the front to accept wand devices, and (2) an adjustment knob. The yoke is adjustable vertically and accurately to position the wand below eye level on a line parallel with the lower jaw. Tightening the temporal knobs locks the yoke in position.

The standard wand consists of internally spring loaded telescoping brass tubes one quarter inch in diameter and fourteen inches in length. The end of the assembly is beaded with a one half inch sphere that is adjustable for rigidity by means of its mounting spring that may be slid in and out of the end section of the telescoping tubes. (See Appendix 8 for availability.)

Price: \$60.00

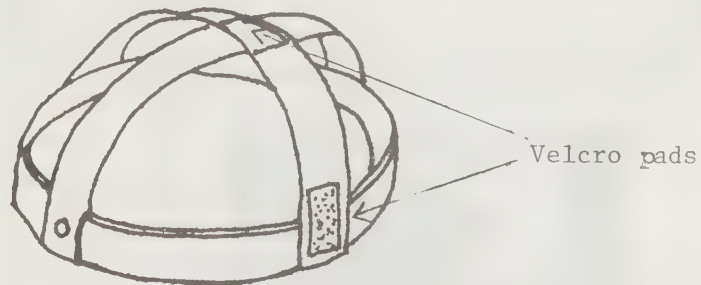


i) Submitted by:
 Mrs. Carmelita Heiner
 7545 Whitlock Avenue
 Playa Del Rey, Calif. 90291

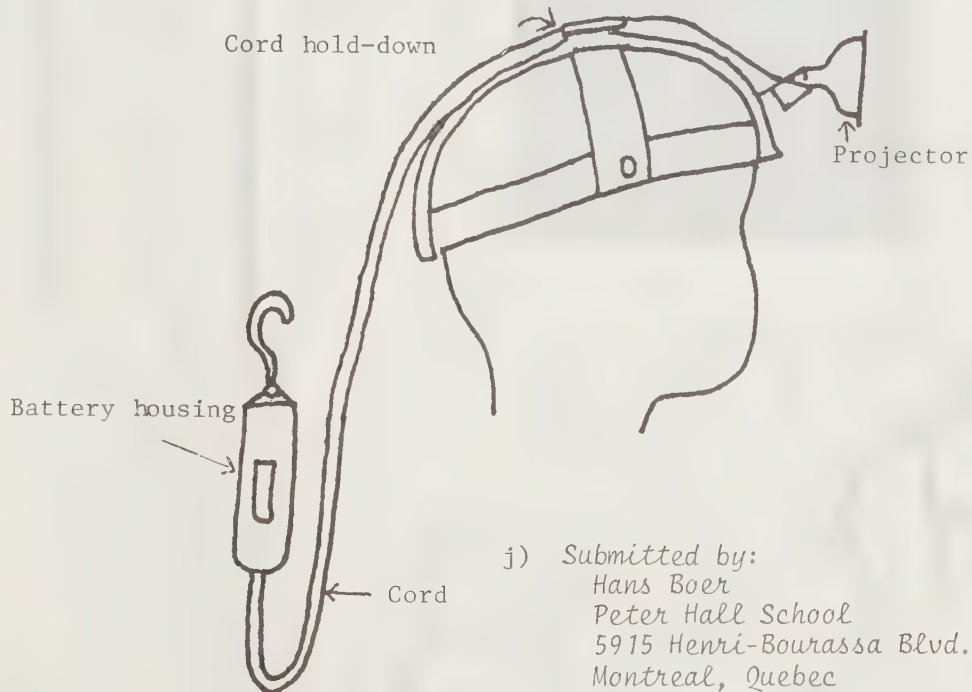
J. Light Beam Pointer

A number of ordinary flashlights were tested to find one which projects a reasonably small and bright spot, suitable to point out symbols. Reflector and bulb were removed from the selected model and attached to a headband with Velcro pads. The flashlight housing is utilized as a battery holder. A flexible cord connects battery to reflector on head band.

The obvious thought of using an optical system like those used in handheld light beam pointers in order to obtain a sharply defined light spot, was not followed because the much larger weight and cost were found prohibitive.



HEAD BAND WITH VELCRO PADS

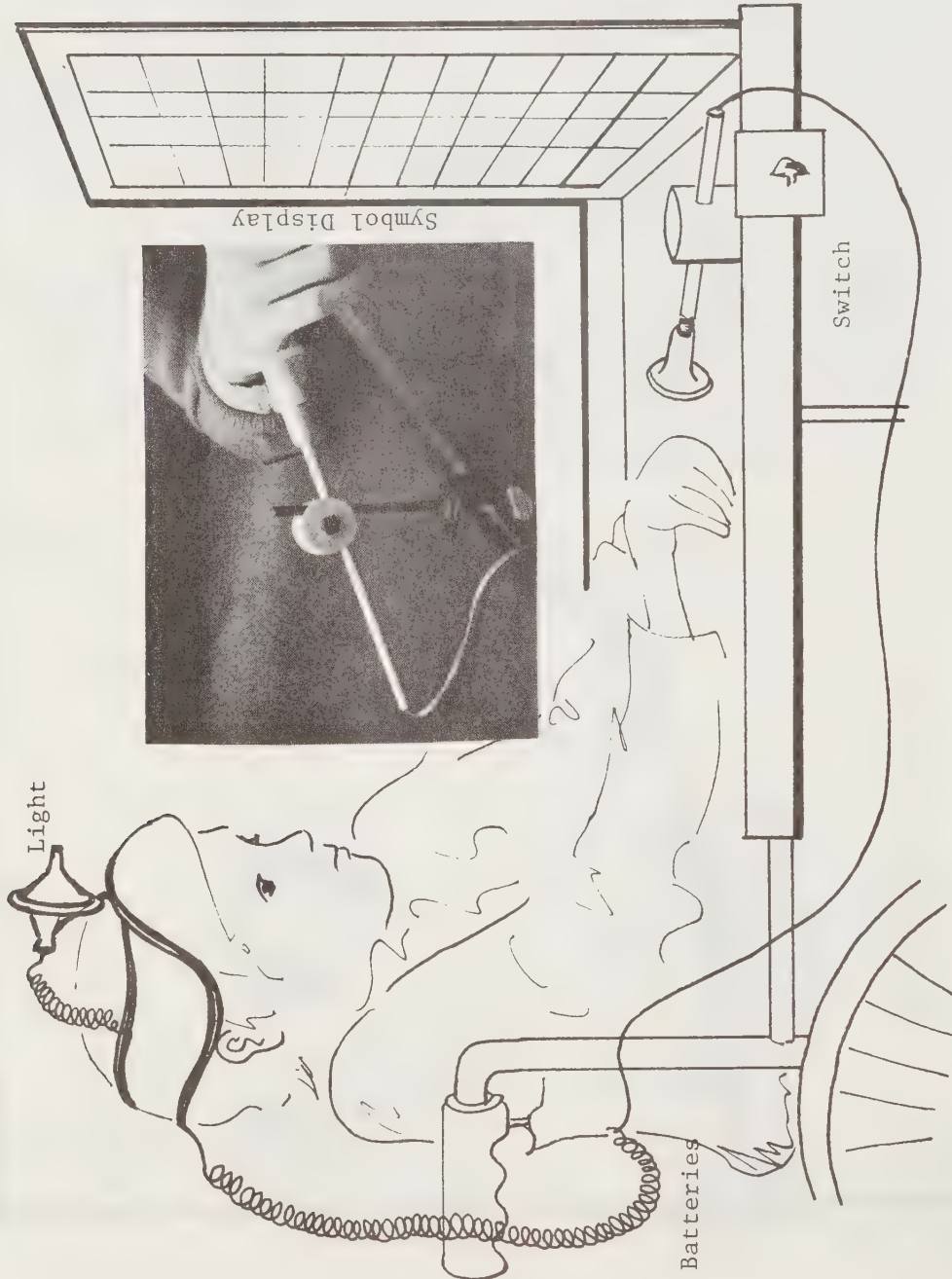


j) Submitted by:
 Hans Boer
 Peter Hall School
 5915 Henri-Bourassa Blvd. West
 Montreal, Quebec

Light and strong, this headgear is held in place by flexible spring supports around the ears, and supports a multi-directional light source. A rechargeable cadmium battery is located and stored on the wheelchair, along with a switch for independent control. The light source is detachable, allowing a typewriter pointer to be substituted in its place.

Submitted by:

N. Belliveau
Clinique de design
Montreal, Quebec



K. Head Positioned Optical Pointer

APPENDIX 5

TEACHING AIDS AND MATERIALS

- A. Pre-School Symbol Use
- B. The Older Child

pages 310 - 317

A. Pre-School Symbol Use

Symbols for pre-school use should be selected from the children's immediate surroundings and interests, and from a pictographic point of view. To bring symbol shapes into play and into the classroom, the list of aides that follow (although by no means exhaustive) may be useful:

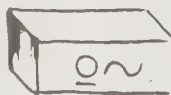
1. Blocks with sandpaper or fabric symbol shapes.
2. Blocks with "matching" symbols. On one side symbols are drawn with helping lines, and on the reverse side regular symbols are used.
3. Blocks with symbols on one side, with matching pictures on the other side.
4. Blocks used with large peg board box may display enlarged pictures of mother, father, etc.
5. Song cards can be used. Symbol-song cards can accompany music wherever possible.
6. Beads, puppets and toys can be marked with symbols.

7. Flash cards showing symbols with "helping lines", in fairly large size can be used:



8. Label doll house and furniture, play-house corner, and classroom with symbols. Outside play can also incorporate symbols on balls, shovels, water tap or tub, etc.

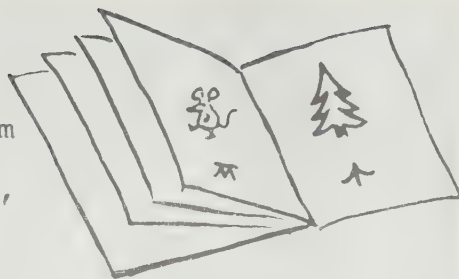
9. Sorting boxes can be used with picture or symbol cards for categories, concepts, etc.



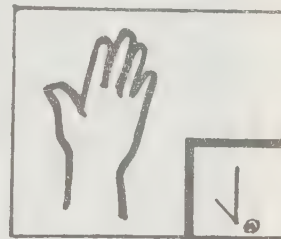
10. Child may enjoy dressing or undressing a felt figure as specific symbol cards of clothing are selected.



11. Picture books can be made from greeting cards (Christmas, Valentines, Easter, Halloween, birthday, etc.) with symbol sentences under pictures.



12. Picture and story books can be made with picture on one page and dictated symbol story on facing page.
13. Cooking can incorporate symbols in kitchen projects through recipes, etc. Symbol toast is made by painting symbols on bread with paintbrush and milk and broiling until toast is brown and symbol stands out in contrast (this is fun for older children as well).
14. Physical education activities can incorporate symbols. Occupational therapists can also use symbols to illustrate and name parts of the body and activities while working with children on gross and fine motor movements.
15. Individual flash cards may be useful in an introductory program or for the teaching of specific words. Cards may vary in size according to visual discrimination ability of the child. Cards may be mounted on tag board or wood with a magnet on the back.



#1-10 & 13 submitted by:

Ann Warrick

Ottawa Crippled Children's
Centre, Ottawa, Ontario

#11-12 submitted by:

Lou Anne Neubert

Town & Country Day School
Springfield, Ohio

#15 submitted by:

Peggy Hughes

Villa Hospital
Toronto, Ont.

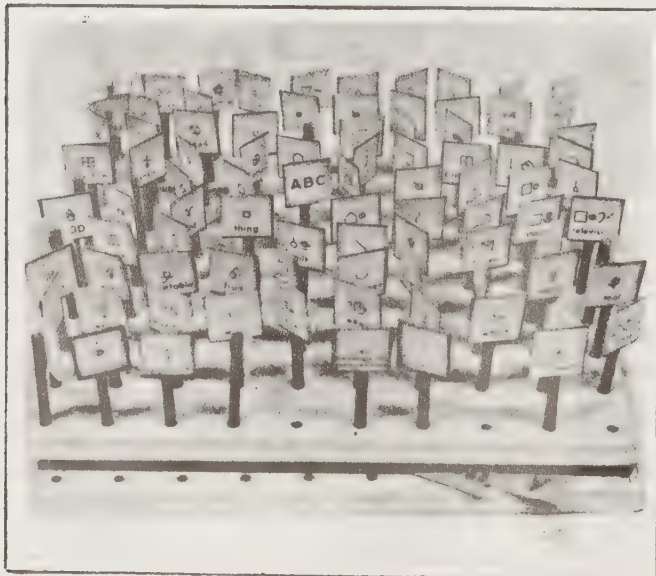
B. The Older Child



16. The weather today is
(picture-symbol)

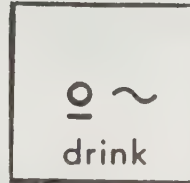


17. Large size wooden squares provide visual feedback of child's output and aid sequencing pattern.

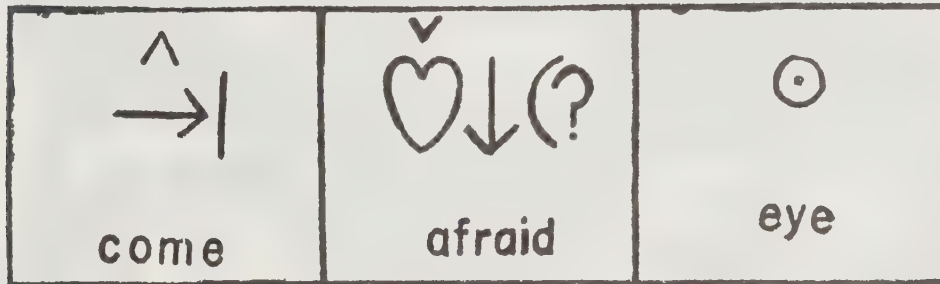


18. Peg board for individual symbols. Peg is same colour as the symbol section from which it comes (OCCC display). Sentence can be built along front row. Also used for visual feedback and sequencing.

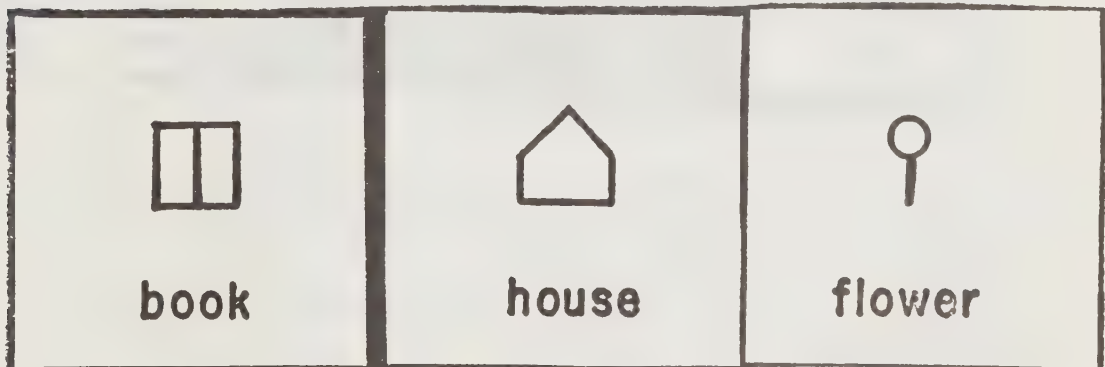
#18 submitted by:
Ontario Crippled Children's
Centre
Toronto, Ont.



19. Acetate sheets are made with symbol display this size and used on overhead projector for tracking.



20. Actual size of symbols appearing on 100 display on vinyl- covered trays (coloured as the O.C.C.C.).



21. 100 boards composed of large size individual symbols and glued on masonite for use as classroom display.

#19-21 submitted by:
 Peter Hall School
 5915 Henri Bourassa Blvd. W.
 Montreal, Quebec
 H4R 1B7

22. Math Teaching Aid

This simple aid is designed to help the handicapped child to grasp the concept of tens. Bright red lights are presented in a row, with every tenth being a yellow light. The present aid has two groups of ten, plus three lights from the third group.

The controls consist of an "ADD" switch, a "SUBTRACT" switch and one labelled "ERASE".

The student has to push the control to step the light display for every count which will reinforce the counting process. A tone is produced for every activation of either the add or subtract control providing an audible feedback.

#22 submitted by:

Mr. J.R. Charbonneau
National Research Council
Medical Engineering Section
Ottawa, Ontario

23. Veri-Tech Materials

A self-correcting teaching aid used for matching exercises. Plastic symbol squares on a master are numbered in sequence (Figure 1), 1-9 or greater, depending on the child's level, as are symbols in the exercise to be matched (Figure 2).

1 ♡↑	5 □	9 ↷
2 △	6 h	10 ♡↓
3 λ3	7 ○↔↔	11 l1
4 l2	8 x♡<<	12 d↷

Master
Fig. 1



(design)

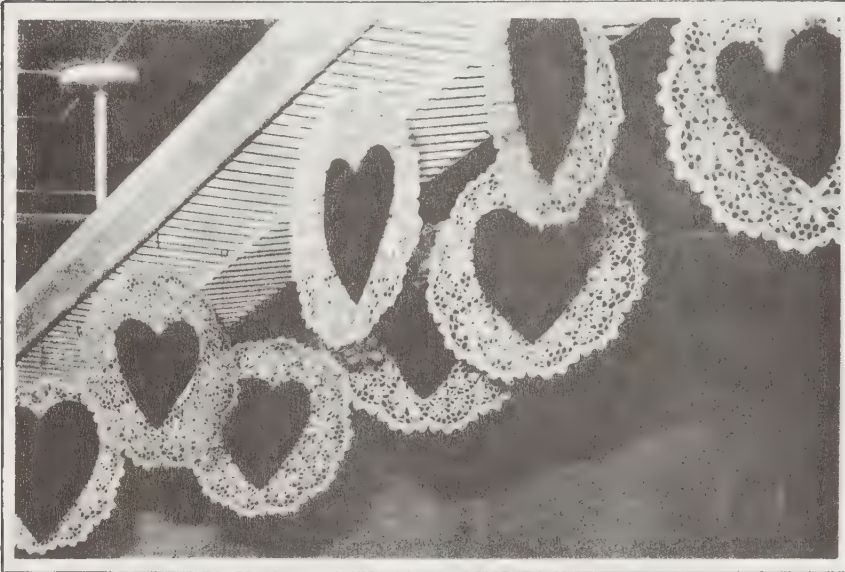
The child must match each symbol to the master and place the symbols of the exercise in the same order. When this is complete, the child turns the exercise over to expose a design that should match one already presented if the exercise is correct.

1 △	5 λ3	9 l2
2 ○↔↔	6 ♡↑	10 ↷
3 l1	7 d↷	11 □
4 h	8 ♡↓	12 x♡<<

Exercise
Fig. 2

#23 submitted by:
Louise Paré
Victor Doré School
Montreal, Quebec

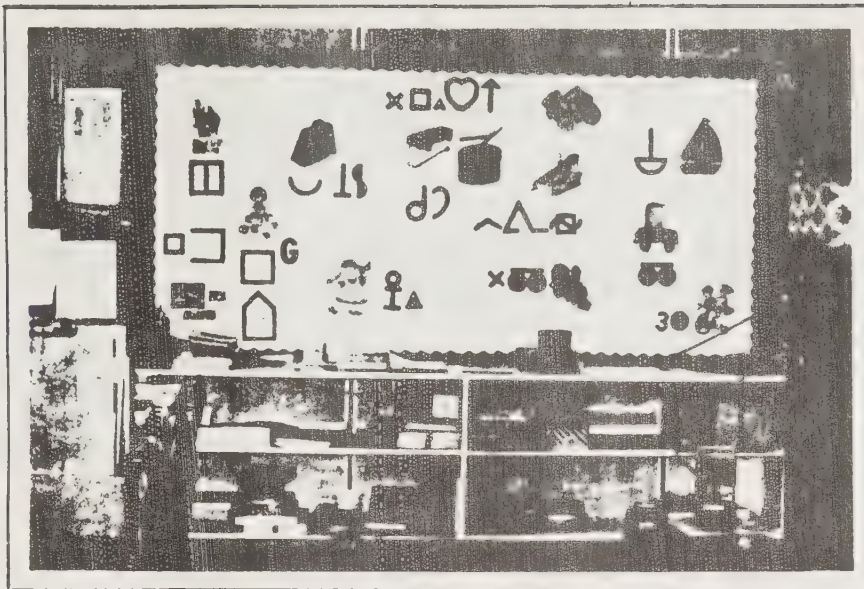
All arts and crafts activities can incorporate symbols. Mobiles, play-do, painting, finger painting, yarn, sandpaper, mosaics and straws are all adaptable materials.



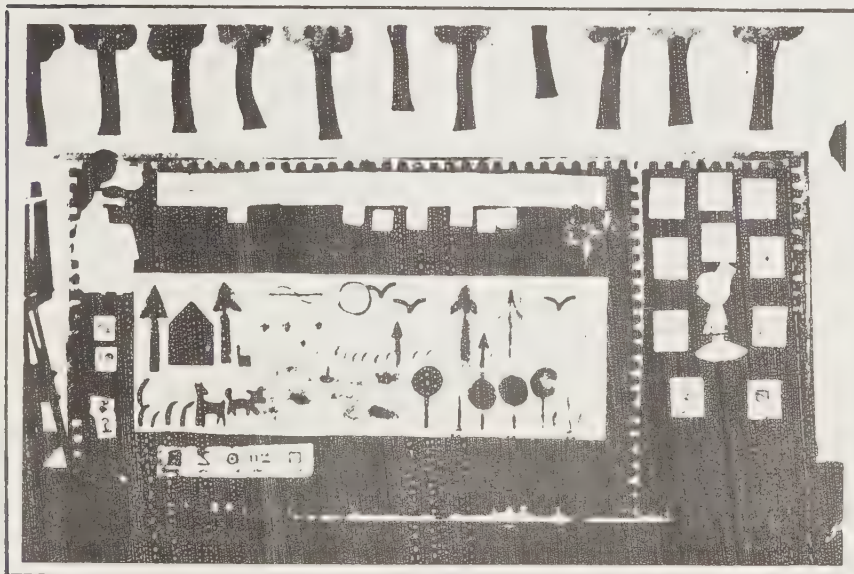
24. Valentine message in symbols make pretty decorations and each child has his own message.



25. Each child makes his own kite and attaches symbols, in this case, things that make him happy.



26. Classroom displays can depict themes such as holidays or, like this one, toys.



27. Symbols may be incorporated into picture design.

#24-27 submitted by:
 Ontario Crippled Children's
 Centre
 Toronto, Ont.



THE UNIVERSITY OF CHICAGO



THE UNIVERSITY OF CHICAGO

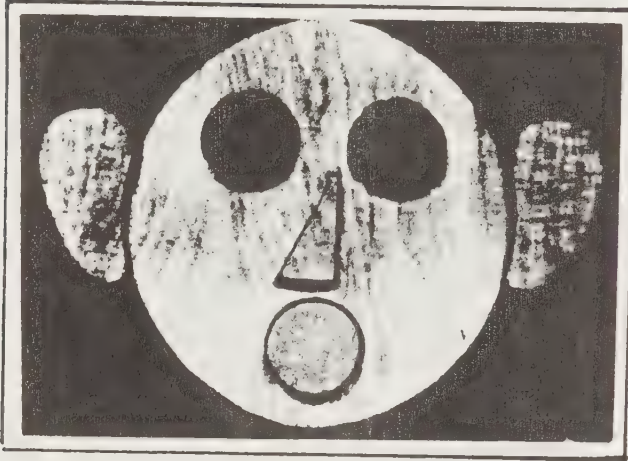
APPENDIX 6

TOYS AND GAMES

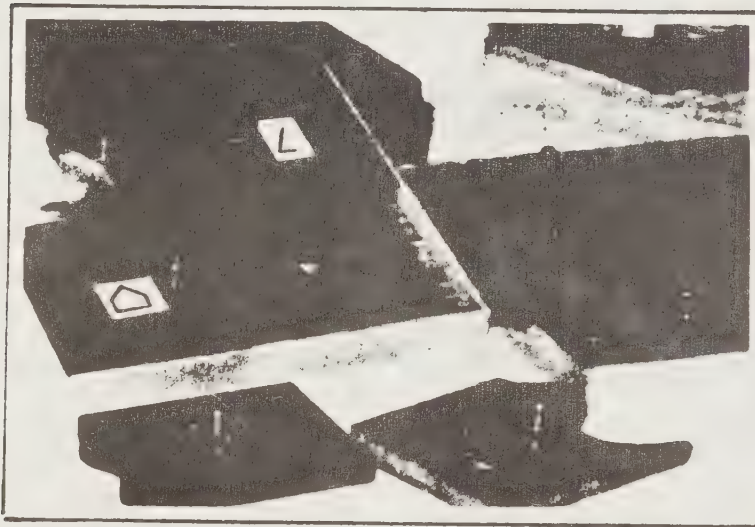
pages 318 - 346

(Construction instructions are given at the end of this section for items with *)

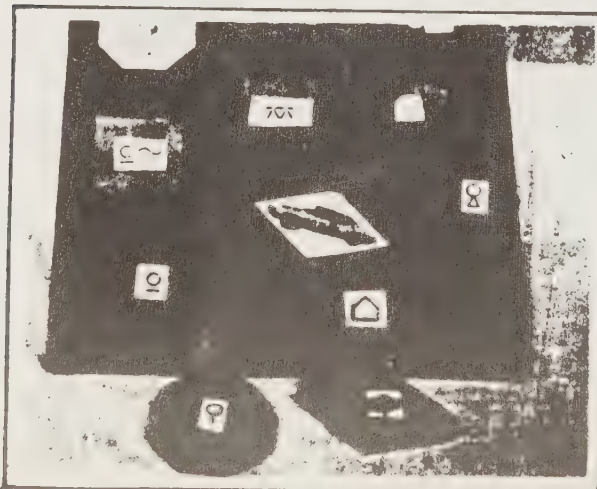
A. Puzzles These can be useful for the teaching of:



1. Body Parts



2. Symbol
Identification
through matching
(here: symbol-
picture)



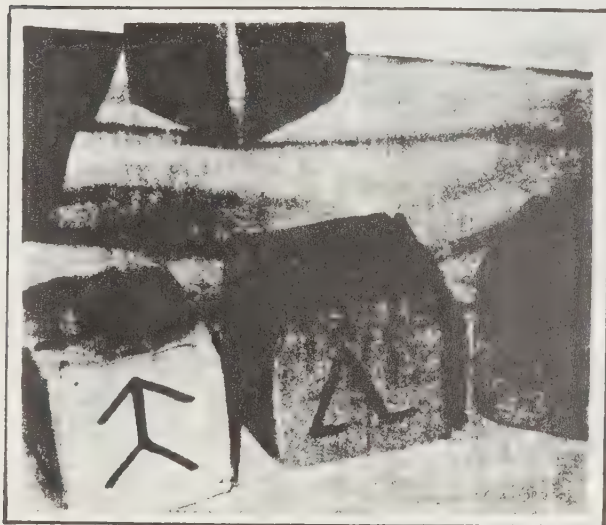
3. Shapes
(here: matching symbols
with picture as well)

B. Blocks

These are for the young child, and may be made of various materials:



4. With symbols painted on wooden shapes, for pegboards* (See Figures 3a-e, p. 341-346).



5. Of styrofoam, with symbol painted on construction paper and attached to each side. One block for subject, one for verb and one for object, so toss of dice will create a sentence for child to read.

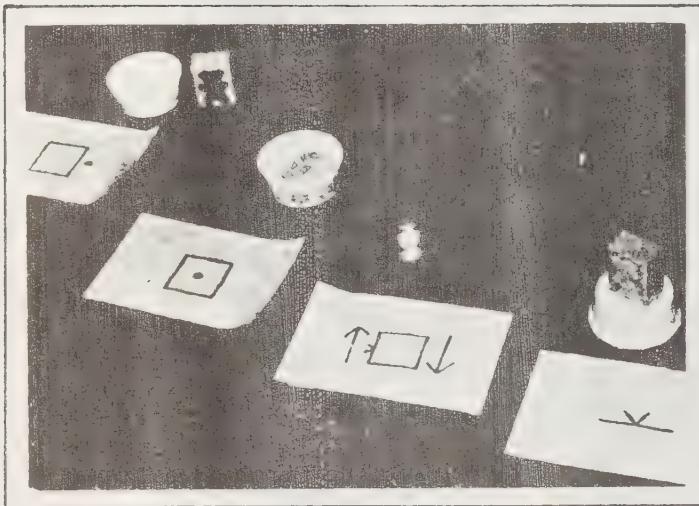
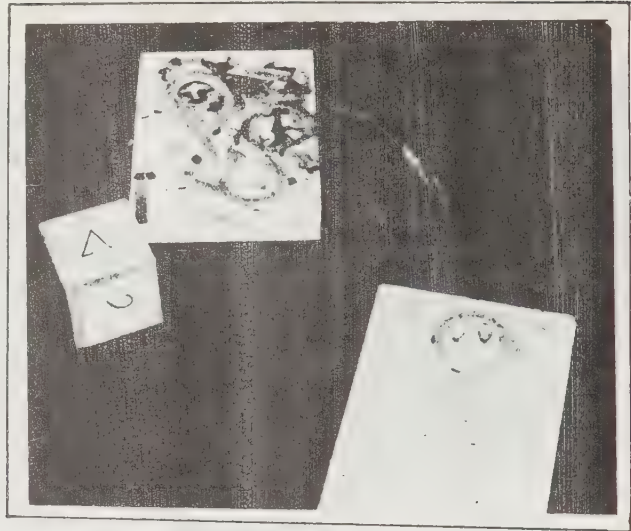


6. Of sponge rubber, with a symbol painted on one side shown with: exercise book where child matches printed picture with symbol cut from fabric or sandpaper.

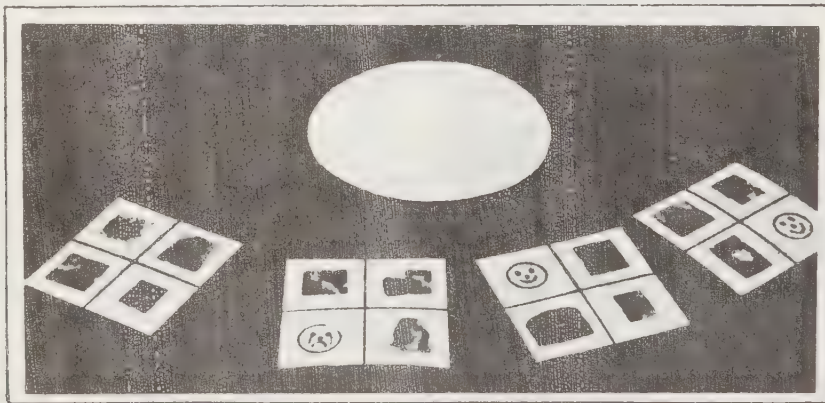
#4-6 submitted by:
Ontario Crippled Children's
Centre
Toronto, Ont.

C. Games Games for the classroom may consist of:

7. Build-a-Person
(according to the throws
of the die).

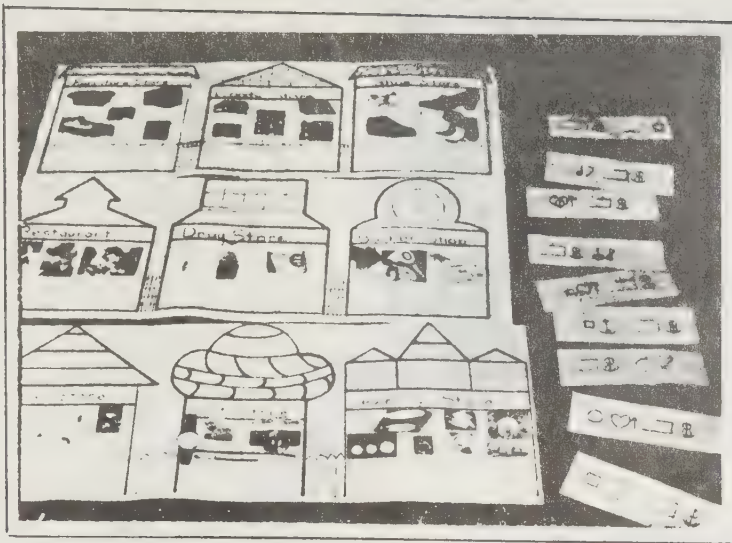


8. Placement directions
(spatial) given to
the child in symbols

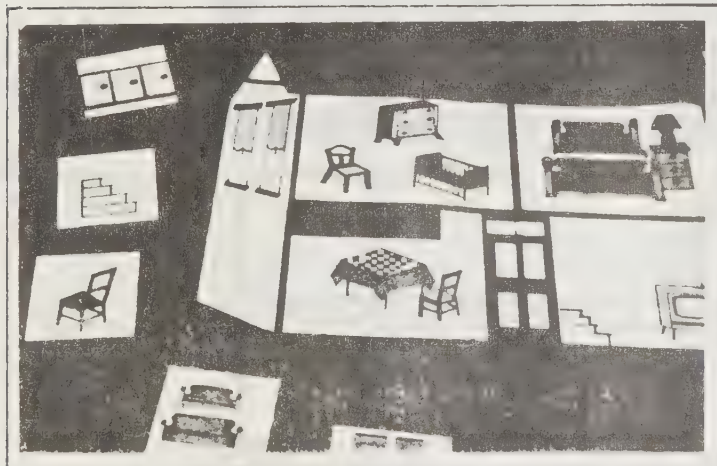


9. Matching a picture with the symbol indicated
by the spin of the arrow.

#7-9 submitted by:
Grace Skanes
Kitchener Waterloo Rotary
Kitchener, Ont.

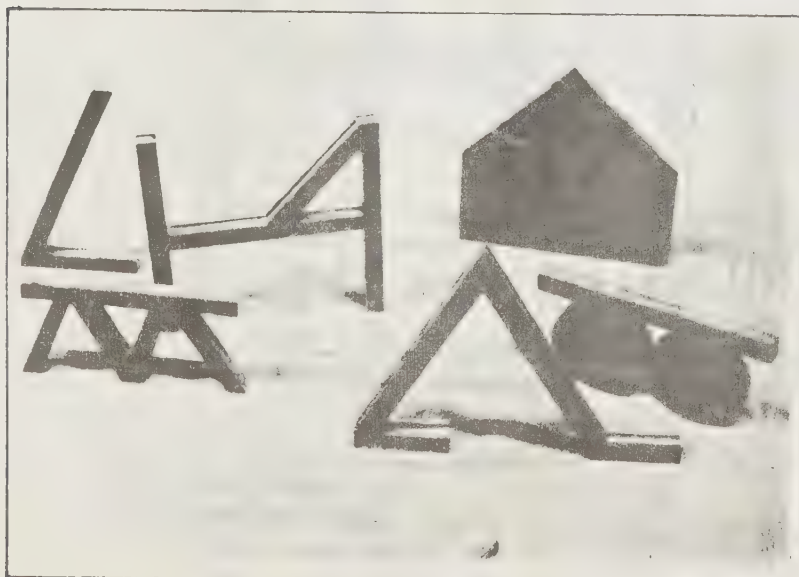


10. Matching the name
(in symbols) with
the correct store.



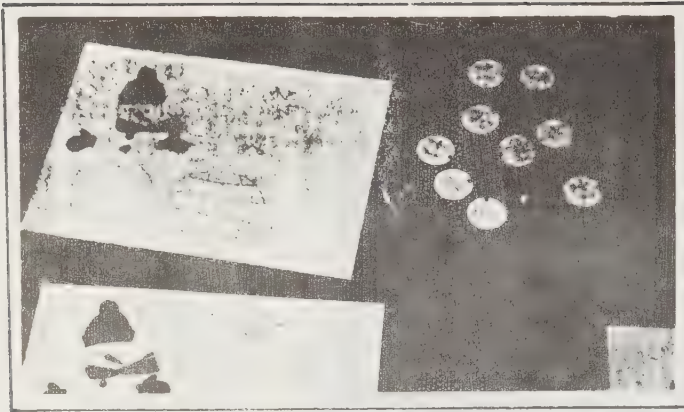
11. Matching pictures
(concept building).

#10, 11 submitted by:
Grace Skanes
Kitchener Waterloo
Rotary
Kitchener, Ont.



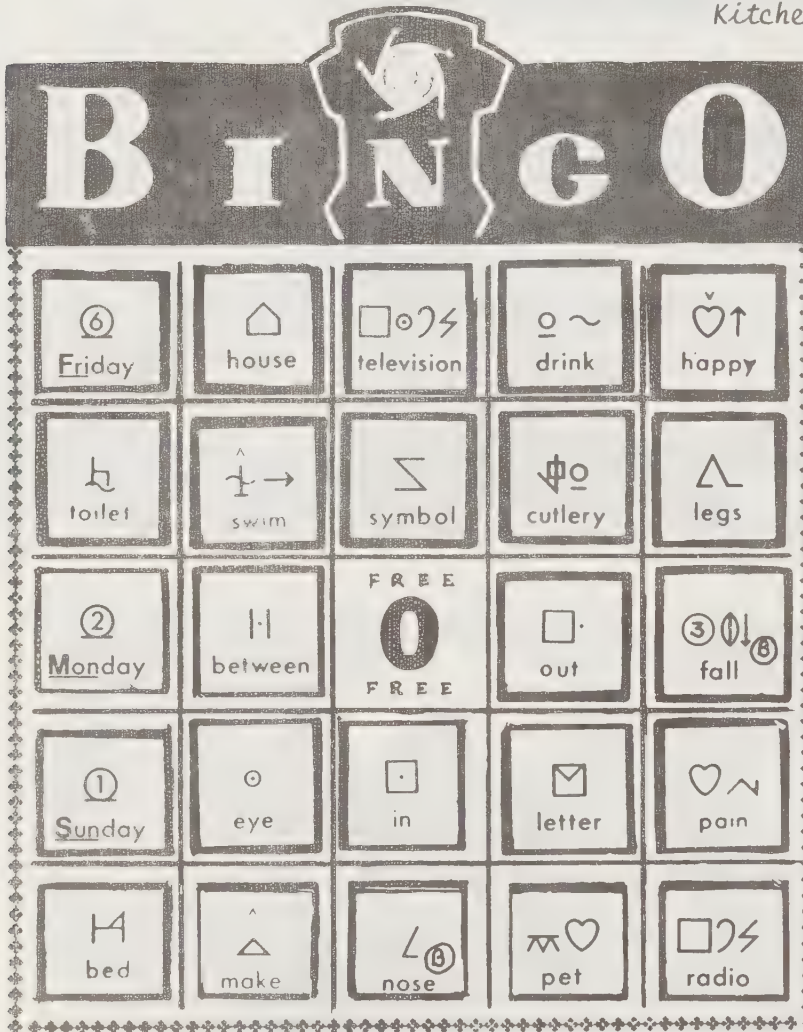
12. Wooden stand-up
symbols also
function as toys.

#12 submitted by:
Ontario Crippled
Children's Centre
Toronto, Ont.



13. Matching
(symbol to
picture parts)

#13 submitted by:
Grace Skanes
Kitchener Waterloo Rotary
Kitchener, Ont.



14. Symbols cut from
100 board and
mounted on BINGO
card. Called by
word.

#14 submitted by:
Keith Pettigrew
Participation House
Markham, Ontario

15. Action Hat helps children learn to take turns. Children can talk only when wearing the Action Hat.



#15 submitted by:
Carol McLaughlin
Rideau Regional
Smith Falls, Ontario

16. Silent Instruction can be turned into a game and is effective in developing concentration. All communication between teacher and children must be in symbols or gestures.

17. Odd Man Out provides training for mechanical scanning by stopping on the symbols that do not belong in a category.

#17 submitted by:
R. Charbonneau
National Research Council
Ottawa, Ontario

18. Snakes & Ladders-Type Board Games can be made with drawings or pictures if desired. A throw of the dice takes a child along the ladder. Obstacles on the ladder can be used to teach almost anything: single symbols, colours, opposite, parts of speech, categories.

#18 submitted by:
Louise Rooney
MacKay Centre
Montreal, Quebec

Dominoes, Lotto, I Spy, Scrabble can each be adapted to symbols. Tic-Tac-Toe can be played by substituting any two symbols for X and O.

19. Blissentration is a game that can be used to teach verbal and non-verbal people the Blissymbols. This game utilizes the format of the television game show, 'Concentration', incorporating pairs of Blissymbols rather than commercial items.

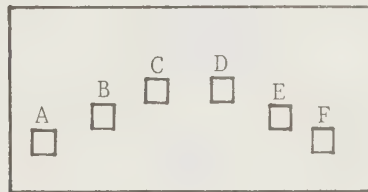
Twelve pairs of symbols are placed on a board, concealed. It is the job of the two competitors to match up the symbols. Once they match two symbols, they must identify the proper word meaning that goes along with that symbol. They are awarded a point for each accomplishment. The person winning the last point (i.e. identifying the word) earns the opportunity to make the next selection. The points are tallied and a winner declared.

This vehicle has proven exciting and positive in several areas:

- (a) Fun competition for participants and resident/visitor spectators;
- (b) Feasible teaching aid;
- (c) Valuable device to evaluate perception skills/abilities (behaviour); and
- (d) As a dynamic tool for creating a positive social environment for interaction.
(i.e. Winning students may compete against the staff member of their choice. Some people wager a dinner or movie!)

BLISSENTRATION

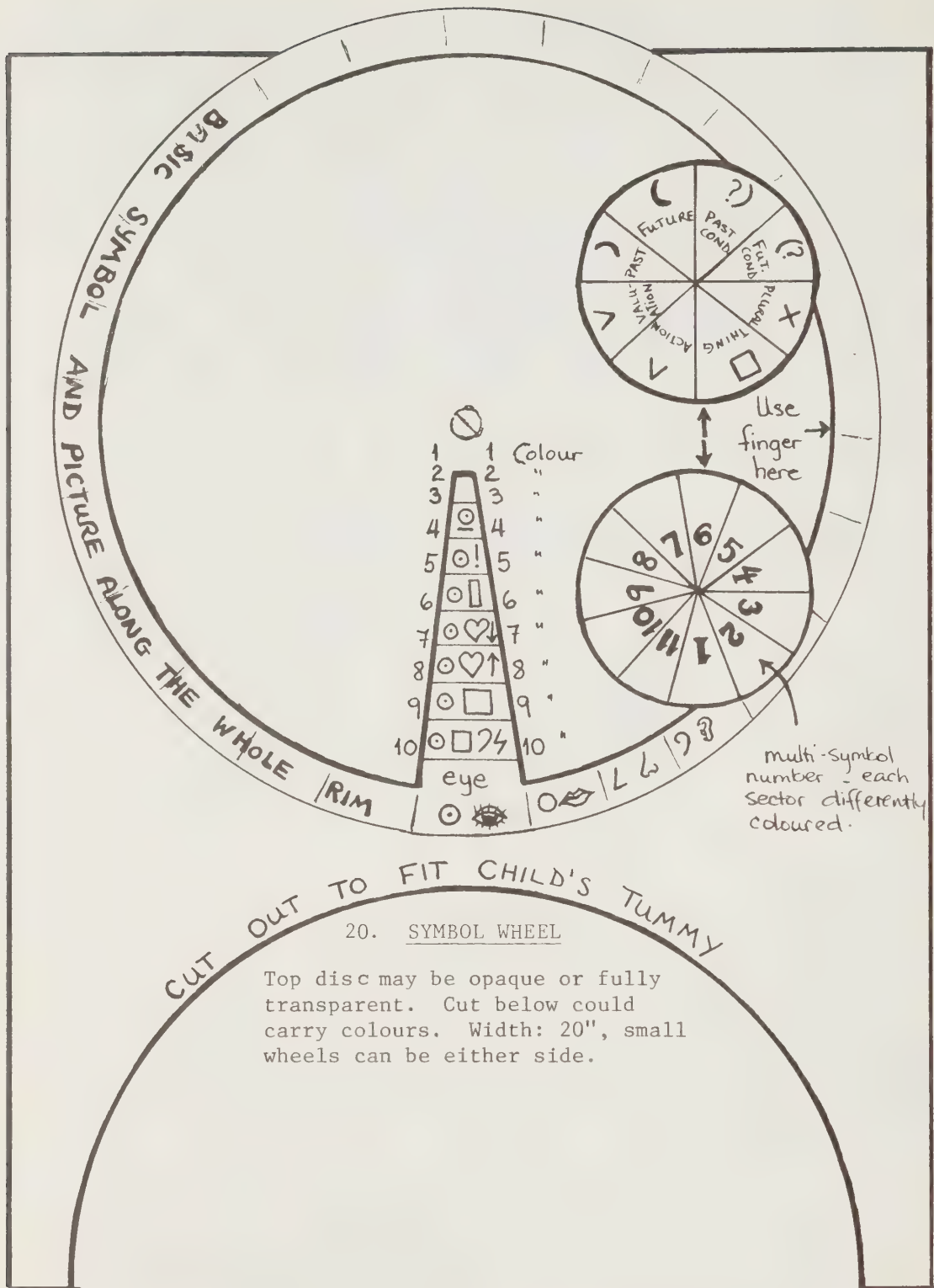
		A	B	C	D	E	F	
Red	1							← Adhesive picture hangers
Yellow	2							
Blue	3							
Orange	4							
Green	5							
Brown	6							

SPECIFICATIONS:

Bristol board sheet, 24" x 36", with 24 adhesive picture hangers (white squares with aluminum hooks, 6 for 29¢) properly arranged - 6 across and 4 down. The rows are colour coded and number, 1 through 4, while the columns are identified with letters A through F. Cards with symbols on one side and blank on the other are placed randomly on the 24 hooks. The words are also displayed for their view. All the competitors have to do is start their selection.

#19 submitted by:

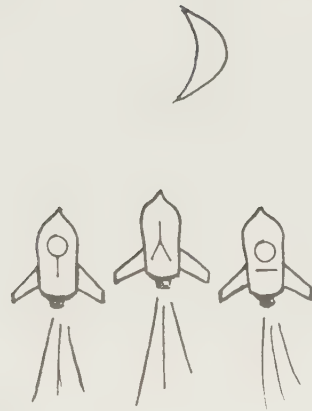
Alan Aylward
 Bloorview Children's Hospital
 25 Buchan Ct.
 Willowdale, Ontario



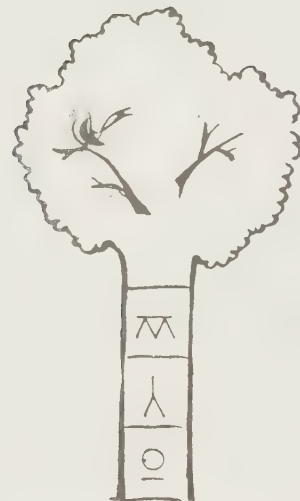
#20 submitted by:
 C.K. Bliss
 P.O. Box 222
 Coogee 2034
 Sydney, Australia

BLACKBOARD GAMES

21. Rocket Ship to the Moon
 Draw rockets and moon on blackboard. If player is able to identify symbols he goes to the moon.



22. Climb a Tree, Land a Plane, Win a Sailboat Race, etc.
 can be played the same way and used to teach many different concepts on the blackboard.

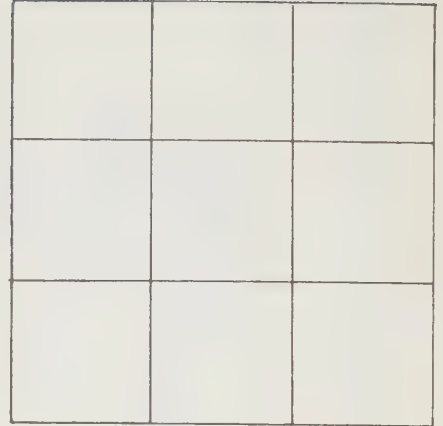


#21, 22 submitted by:
 Louise Rooney
 MacKay Centre
 Montreal, Quebec

23. Secret Symbol Message

Draw a box on the blackboard.

Divide it into 6 or 9 sections.
(depending on length of children's
symbol sentences.)

STEP 1:

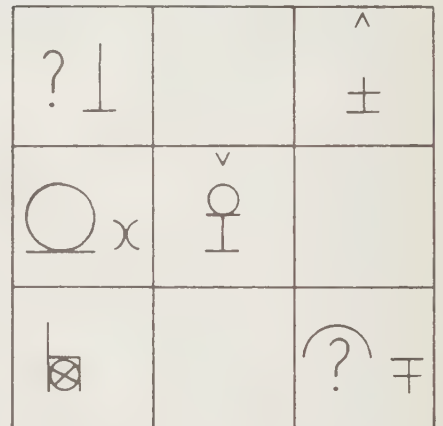
Child or teacher then makes up a message and writes it on
separate paper.

e.g. ? ̸ ? ⊥ [^]± ^v♀ ⊞ ⓪χ

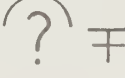
STEP 2:

Symbols of symbol sentence are
then jumbled up and placed
randomly in each of the squares.

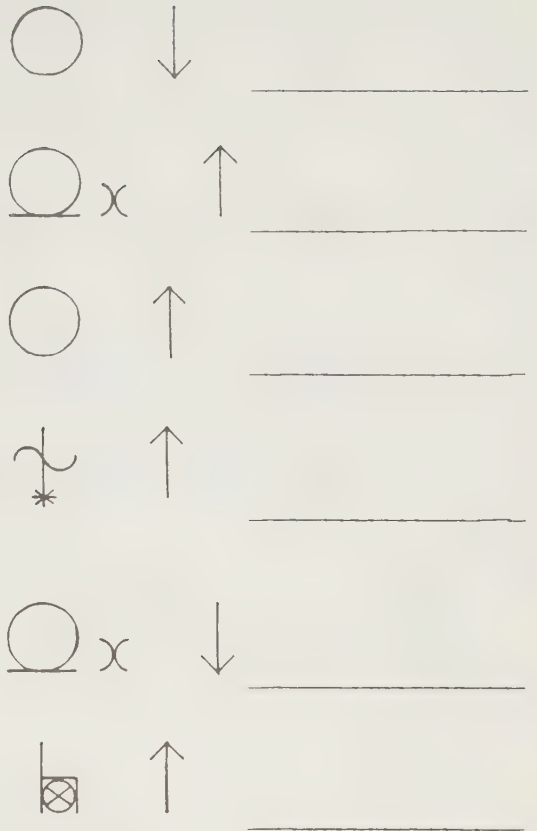
If there are blank squares left
over, fill them in with new or
"favourite symbols" of the
child.



STEP 3:

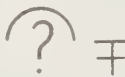
 who	 rain	 have
 today	 new	 sun
 wheelchair	 snow	 guess

Put the arrows in a different colour so the children don't think they are part of the symbol beside them.



Now the child has to make the secret code. (The teacher will probably have to do this step until the child catches on.)

(a) Find the first symbol of the secret message.

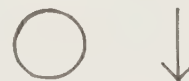
e.g. 
guess

Look for a symbol in the box above or below it.

e.g. 
sun

Your first secret code would be (find  go  to discover the first word).

Your code would look like this



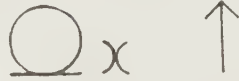
(b) What is the next symbol in the secret message?

e.g. 
who

Look for a symbol above or below it.

 is below,
today

So your secret code for your second word would be -



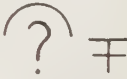
You would continue to use this code until you completed the message.

(Directions would also include  right and  left when children are ready for it).

STEPS 1 to 3 have been done by a single child or group of children with or without the help of a teacher. Now the whole class becomes involved as they try to discover the secret message.

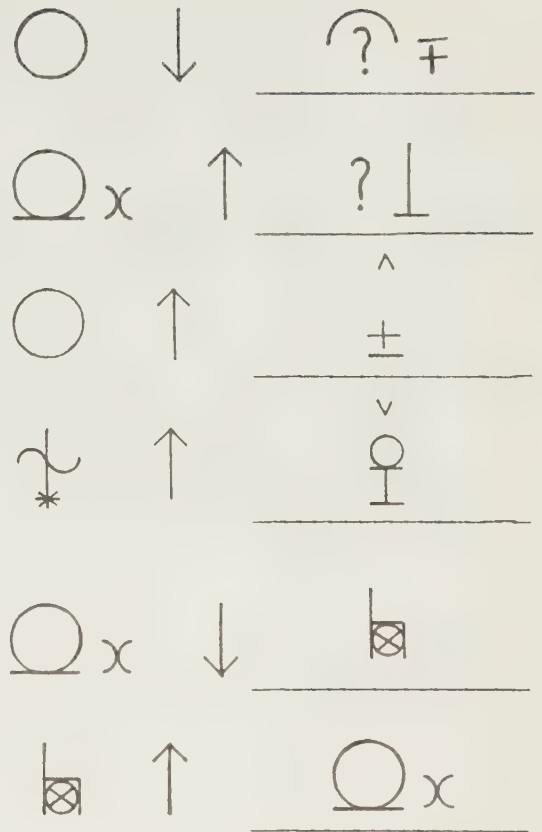
STEP 4:

For those who have children who are starting to notice the word under the symbol or beginning to read, it may be useful to have the children find each symbol in the squares and write the word underneath.

 who	 rain	 have
 today	 new	 sun
 wheelchair	 snow	 guess

STEP 5:

? ⊥	↯	^ ±
⊙ x	⊙ v	⊙
⊠	↯ *	⊙ ?



- (a) If the children are at the matching stage, the teacher may point to the symbol in the code

e.g. 
sun

then ask them to indicate when she points to the same symbol in the box. Teacher should then scan the squares with her finger until the children find and tell her to stop.


sun

- (b) Then they should indicate, by looking at the arrow, what direction they should go to find the first symbol of the secret message
- (c) The teacher then writes that symbol in the bland beside the code

e.g. ⊙
?

Continue this process until all the message is unscrambled.

(If the class is beyond the matching symbol to symbol stage, the teacher may just look at the code herself then say, without any visual clue "Stop me when I point to 'sun'". Then proceed to point to the symbols in the squares.)

- (d) Then have the class guess who wrote the message. If the message asks a question, have them guess the answer to the question.

This game has prompted much discussion and excitement in our room. Some children are reserving the secret message two days in advance. Others, who have been hesitant in their symbol output, are anxious to produce a message and put it on the blackboard.

#23 submitted by:
Nancy Lageer
Symbol Teacher
Ontario Crippled Children's
Centre

24. Puzzle Board (Figure 1)SPECIFICATIONS:

Finished Board: Board surface is 15" x 10", constructed of 1/4" plywood bonded to 1/4" plywood.

Construction: Base

3" squares cut into 1/4" plywood base before bonding.

Pieces

3" squares made from 1/2" plywood (to project 1/4" above the surface). Cut for easy fit.

Finishing

Clear varnish. May be painted. Pictures, symbols and handles to be added after puzzles are completed.

OBJECT OF THE GAME:

May be used for matching feelings, activities of daily living, people or body parts.

PLAY:

Child fits block with symbol into space containing appropriate picture.

PURPOSE:

- (a) Symbol identification;
- (b) Eye-hand co-ordination;
- (c) Gross motor control.

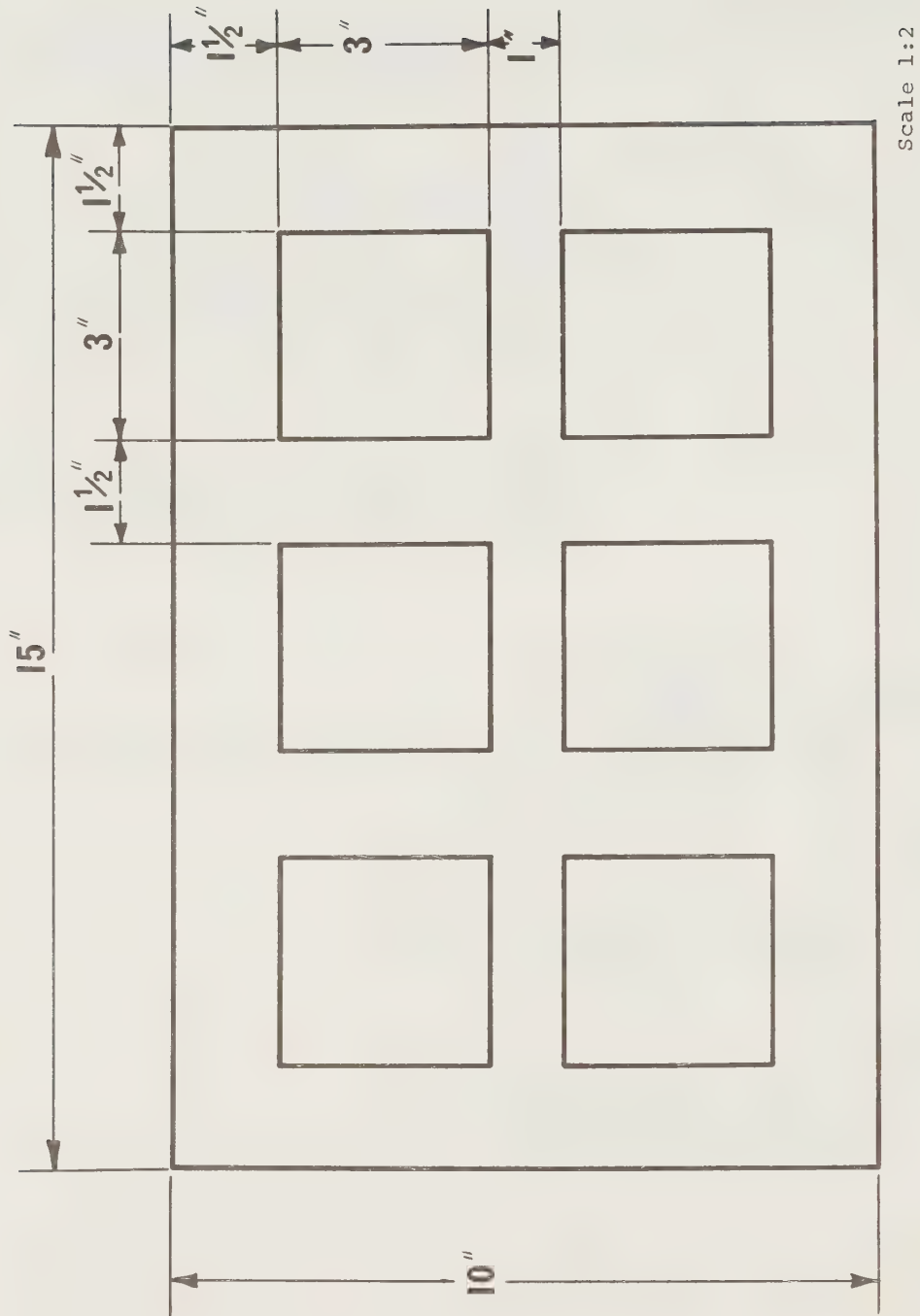


Fig. 1 PUZZLE BOARD

25. Cut-Out Puzzle (Figure 2a, b)

SPECIFICATIONS:

Finished Board - 17" long x 10" wide
x 1/2" deep.

CONSTRUCTION:

Base

1/4" plywood bonded to 1/4" plywood
from which shapes have been cut out
(see shapes marked cut-out on Fig. 2a)

NOTE: the cut-out should be slightly
larger than the shape templates so
that the shapes may be easily put in
place.

SHAPES:

1/2" plywood cut as per shape tem-
plates so that the shapes project
1/4" above the finished board.

FINISHING:

Drawn and painted figures as shown
in Fig. 2a,b. Varnished Board includ-
ing cut-out sections on the base
board. Varnished cut-out pieces.

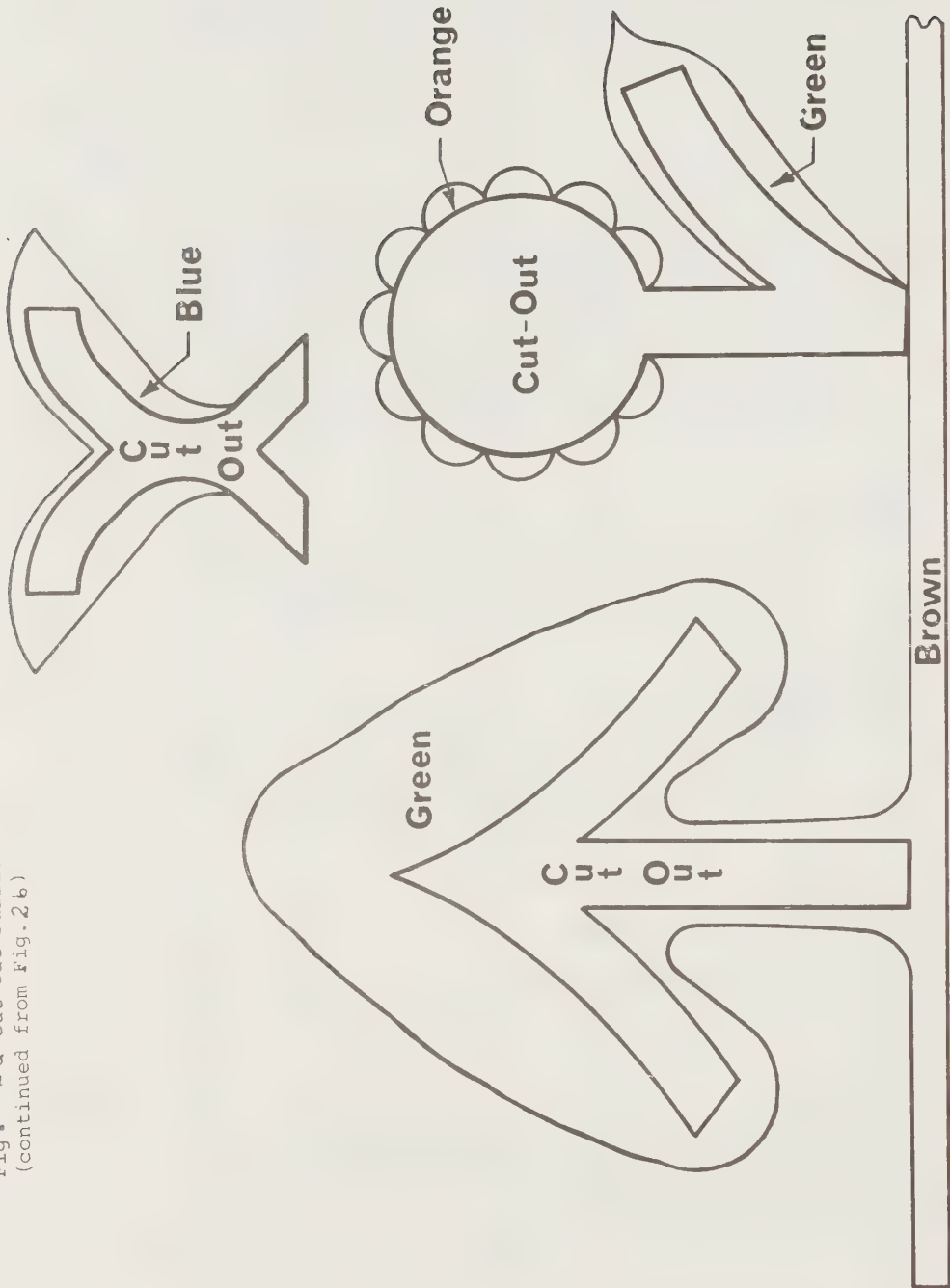
OBJECT OF THE GAME:

To locate and place appropriate symbol shape into
picture.

PURPOSE:

- (a) To reinforce symbol shape meaning;
- (b) Eye-hand co-ordination;
- (c) Fine motor control.

Fig. 2a Cut-Out Puzzle
(continued from Fig. 2b)



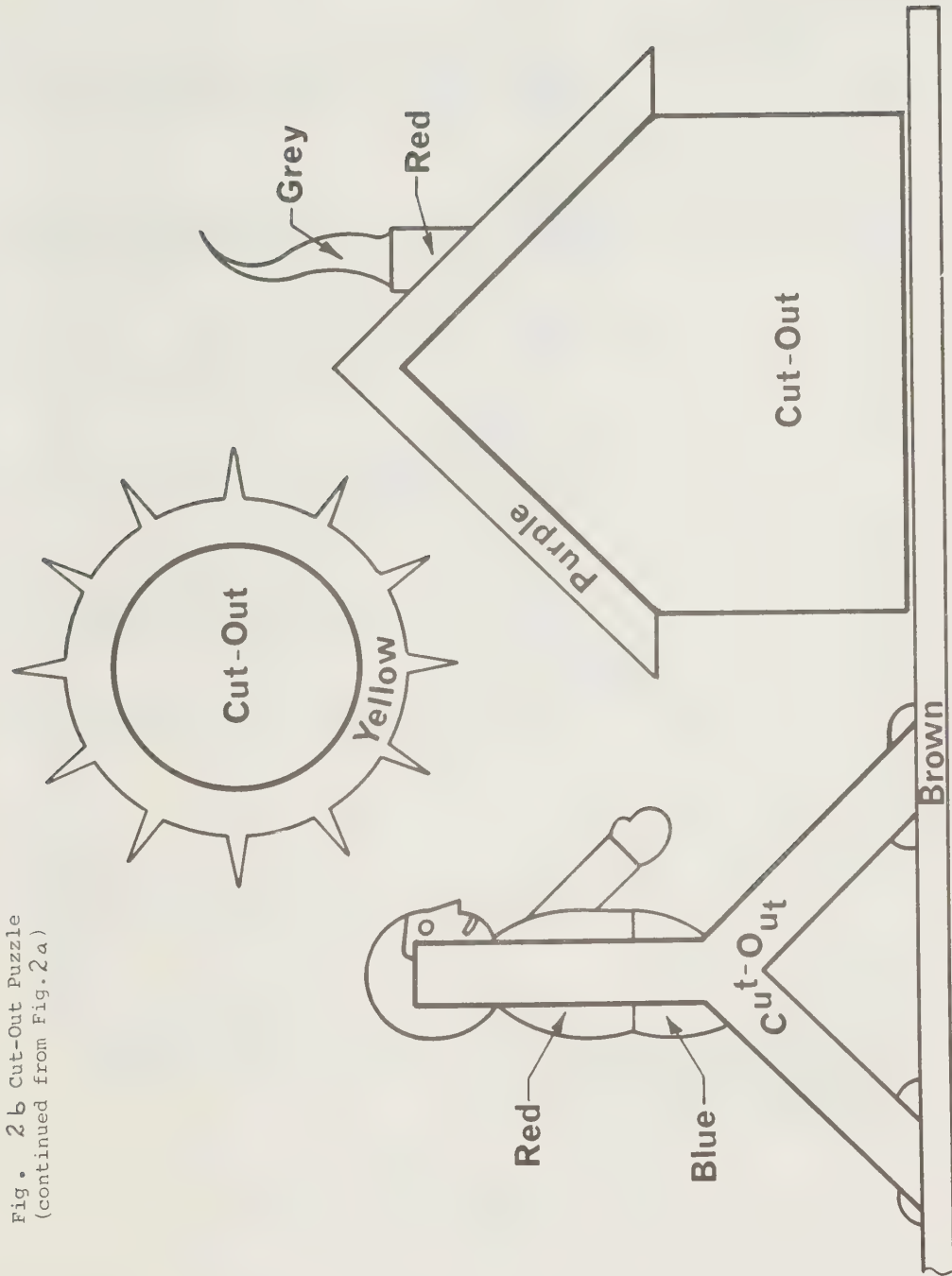


Fig. 2b Cut-Out Puzzle
(continued from Fig. 2a)

26. Peg Board Game (Figures 3a-e)SPECIFICATIONS:

Finished Board: Board surface is 15" square, constructed of 1/2" plywood bonded to 1/4" plywood. (See Figure 3a).

Construction: Base

Road: Cut in 1/4" plywood before bonding to the 1/2" plywood. Cut 1/4" into finished surface, 1 9/16" wide.

Holes: drilled at random (25 in all) 1/2" in diameter x 1/16" deep.

Pieces

37 in all. Peg is made from 3/8" dowelling for ease of fit into holes. (See Figures 3a to 3e).

Rim

1/2" wide, 1" deep, projecting 1/4" above finished surface of the board.

Finishing

Sand and varnish. Paint with high gloss paint.

OBJECT OF THE GAME:

May be used to construct story or reply to question.

PURPOSE:

- (a) Symbol recognition;
- (b) Eye-hand control;
- (c) Depth-perception;
- (d) Fine motor control.

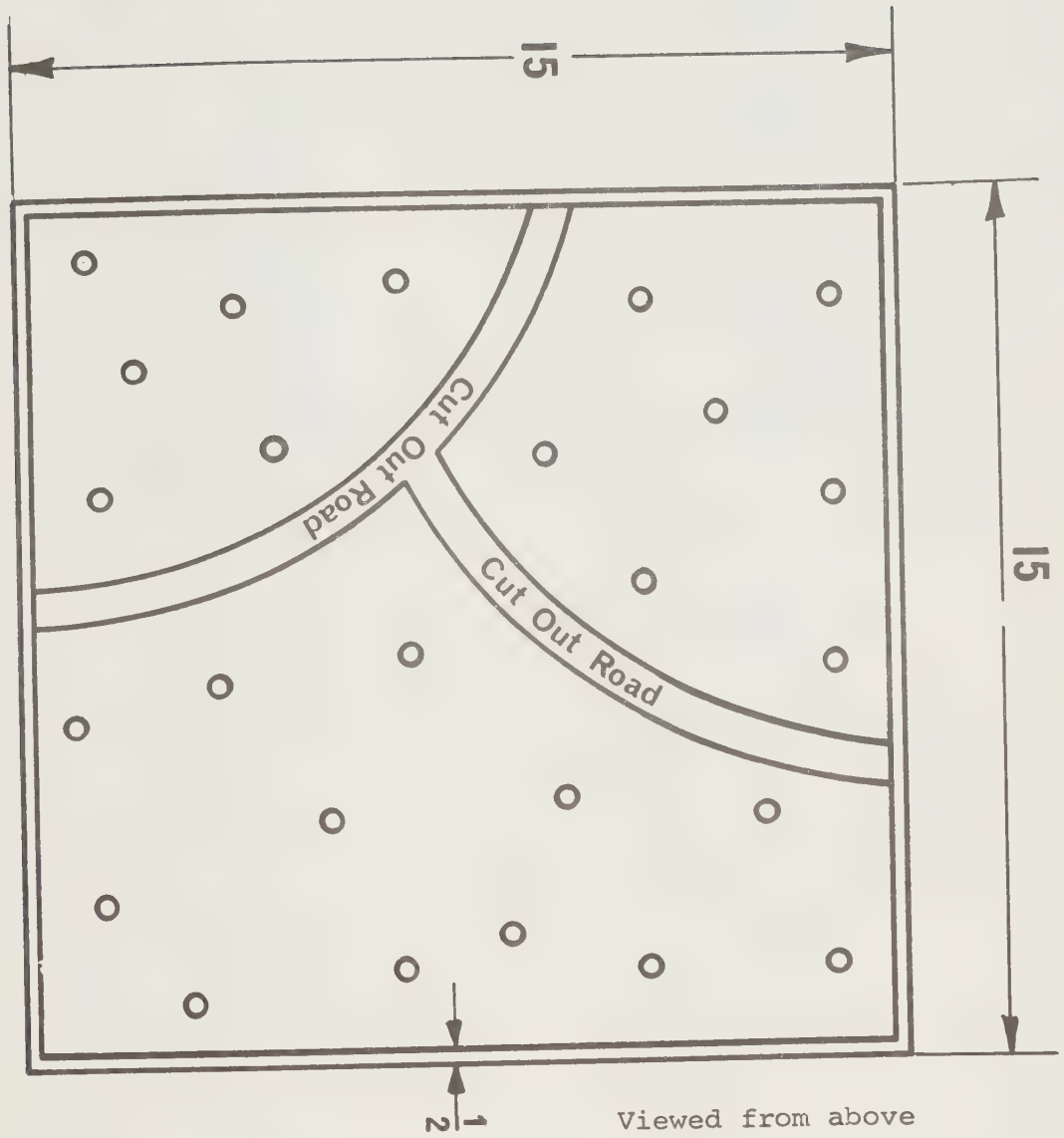


Fig. 3a PEG BOARD

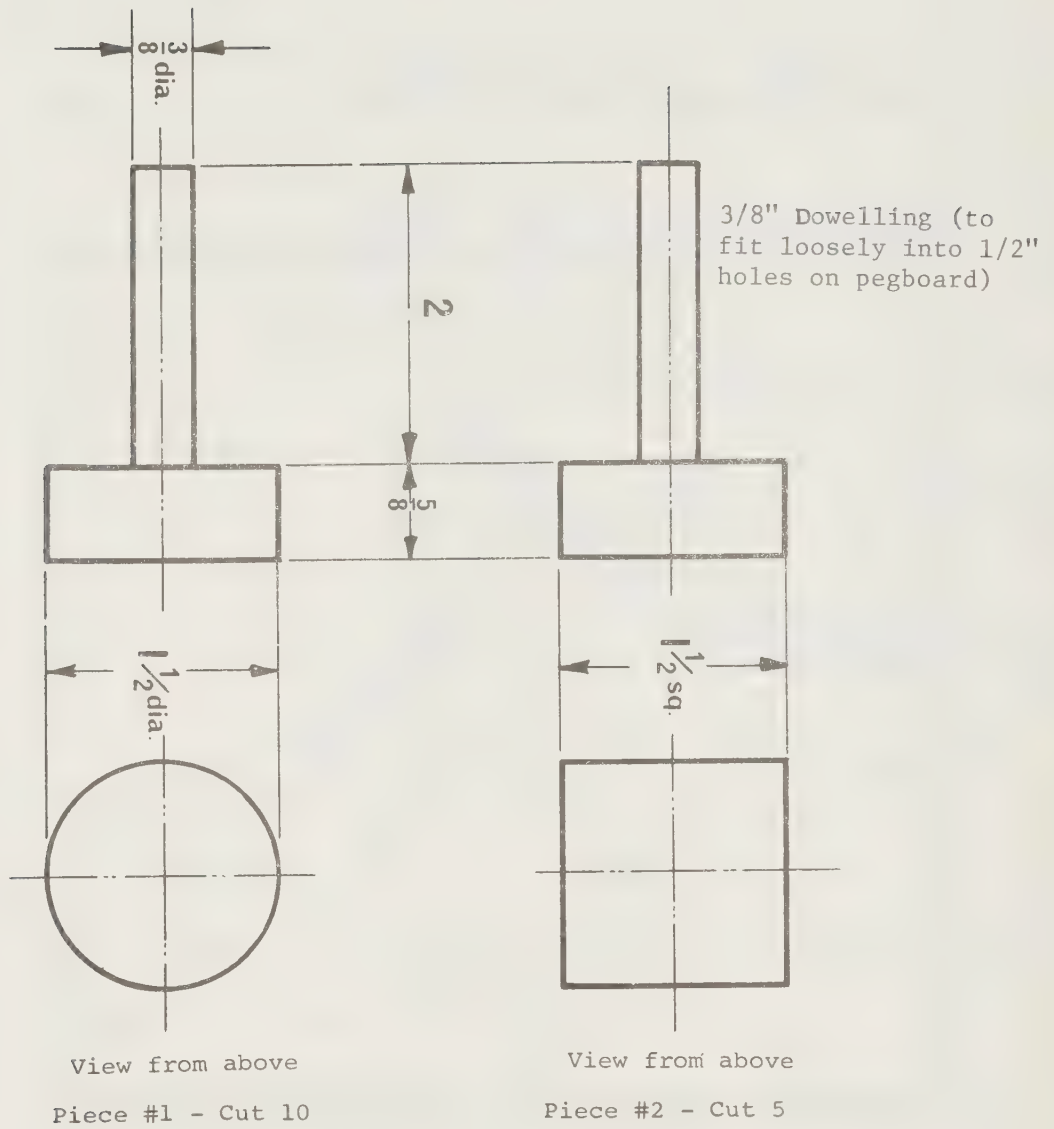


Fig. 3b PIECES FOR PEG BOARD

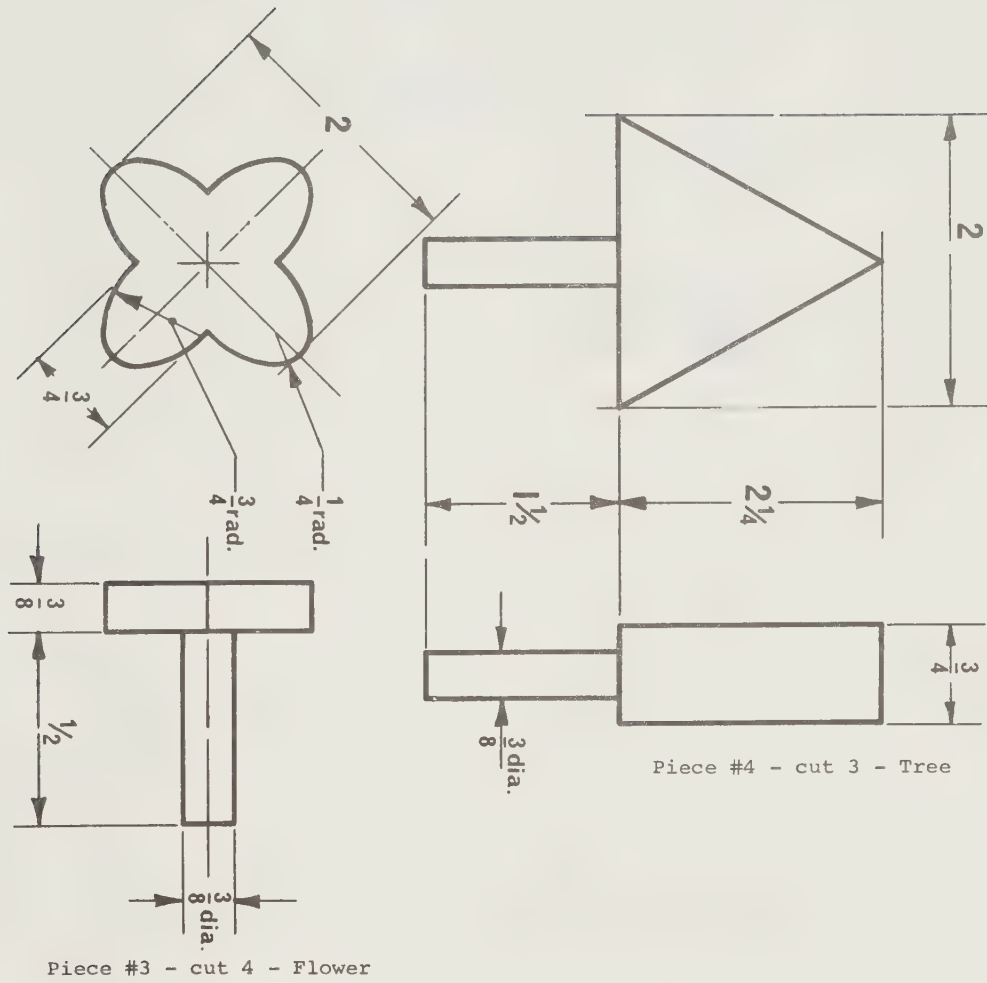


Fig. 3c PIECES FOR PEG BOARD

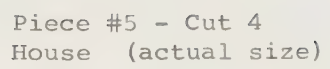


Fig. 3d PIECES FOR PEG BOARD

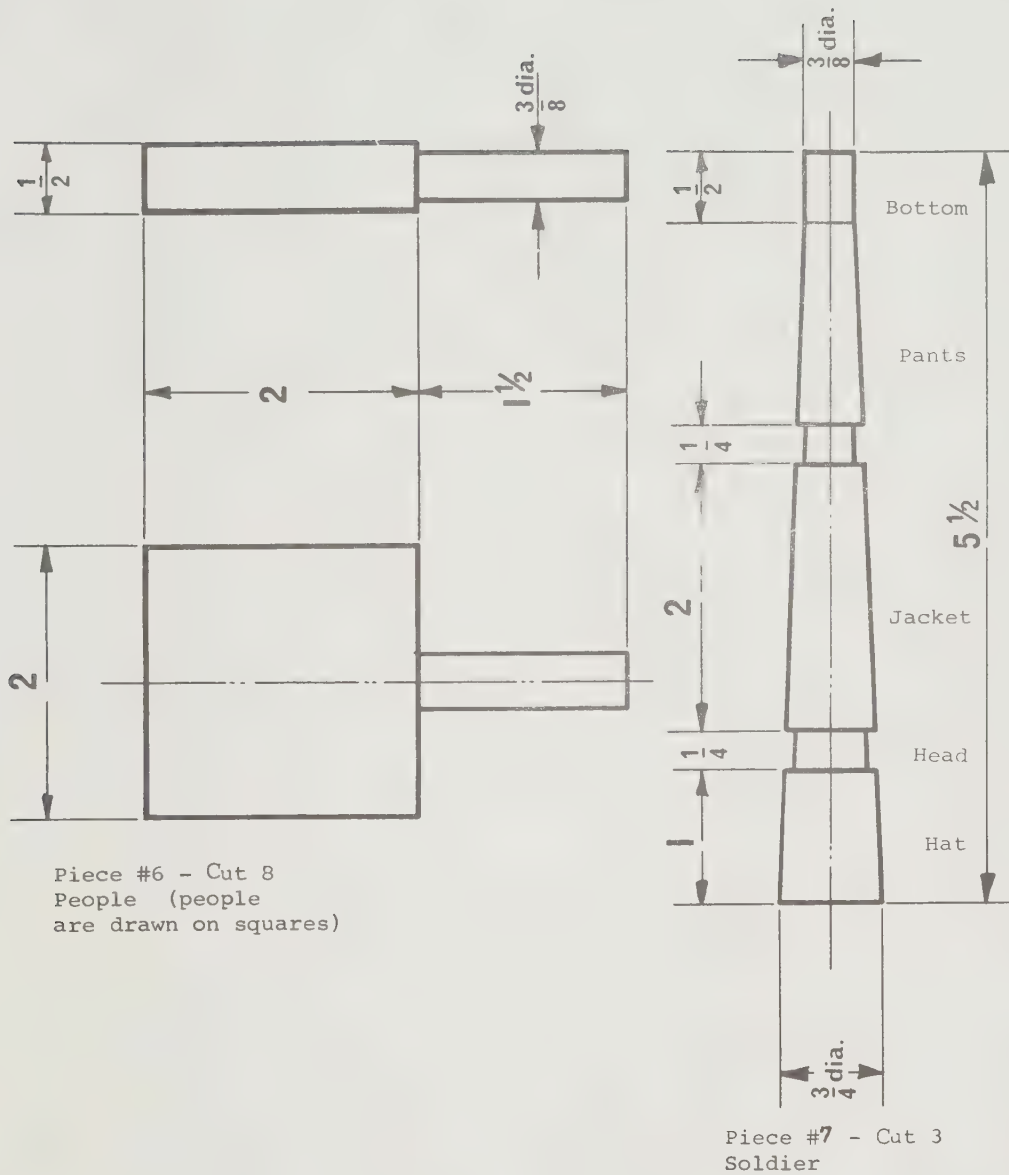


Fig. 3e PIECES FOR PEG BOARD

27. Bean Bag Game (Figure 4)SPECIFICATIONS:

Finished Board: Board surface is 24" long x 17" wide, with body contour cut-out 9" across and 6" deep.

Construction: Base

Taper from 0" to 2" at base (see Figure 4 - side view).

Cut-Outs

Circles are 3" in diameter. Projecting slots to support a thin cardboard square 3" x 3".

Rim

1/2" wide and to project 1/2" above board surface.

OBJECT OF GAME:

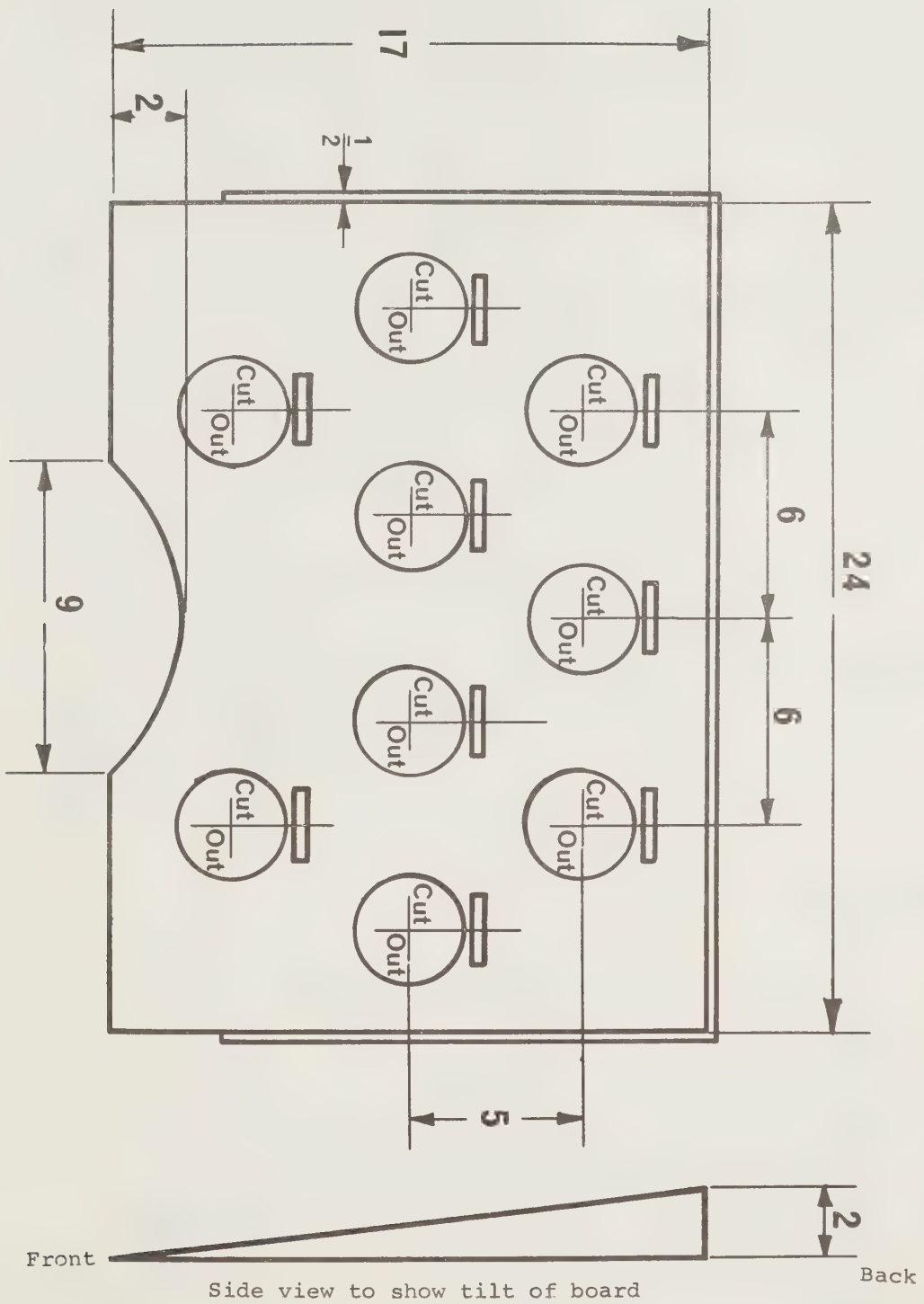
To push or shove an object (bag, bead, block, etc.) through hole designated by symbol or picture displayed in slots.

PURPOSE:

- (a) Symbol recognition;
- (b) Eye-hand co-ordination;
- (c) Gross shoulder control;
- (d) Fine motor control.

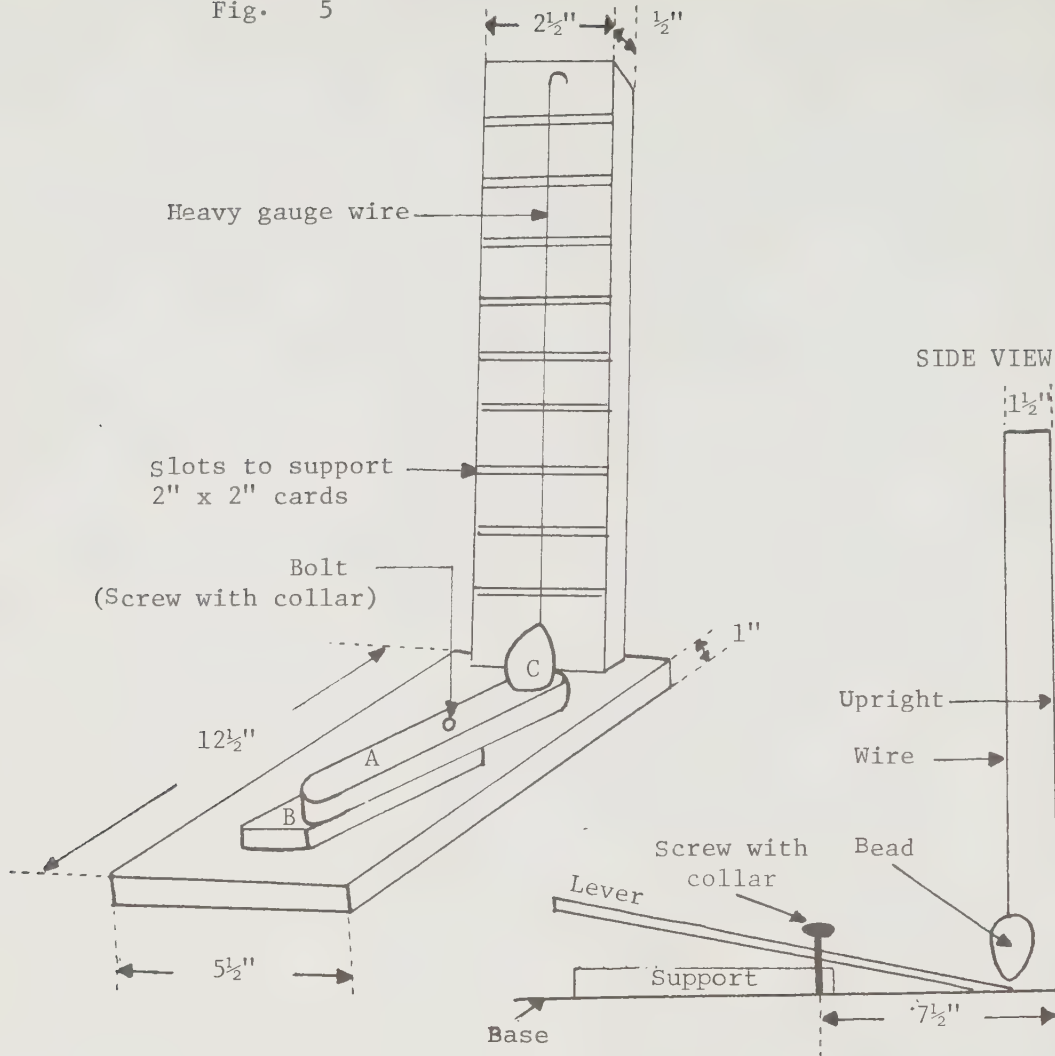
This game may be played on the child's tray, on the floor, or on a table.

Fig. 4 BEAN BAG GAME



28. POUNDING GAUGE

Fig. 5

SPECIFICATIONS:Base

12 1/2" long x 5 1/2" wide x 1" deep.

Upright

20" high x 2 1/2" wide x 1/2".

A. Lever

9" long x 1 1/2" wide x 1/4" (lever is cut away to accommodate wire).

B. Lever Support

5" long x 1 1/2" wide x 3/8"

C. Bead

Oval - 1 1/2" in length.

#24-28 submitted by:

Libby Bate
 Ontario Crippled
 Children's Centre
 Toronto, Ont.

Some experimenting with positioning may be necessary but it should be as easy as possible to move the bead up the upright.

APPENDIX 7

AIDS TO PROGRAMMING

- A. WORKSHEET SUGGESTIONS AND EXAMPLES
- B. PROGRAM PLANNING AND SUGGESTIONS
- C. PARENTAL INVOLVEMENT

pages 347 - 366

A. Worksheet Suggestions and Examples

1. HOW CAN WE TRAVEL?

Suggested symbols: train, car, airplane, bus, wheelchair, taxi, tricycle, legs.

- interspersed with non-travel symbols.

2. CIRCLE THE PERSONS!

Suggested symbols: man, woman, girl, boy, child, mother, father, cousin, uncle, aunt, grandmother, grandfather, sister, brother, relative, doctor, dentist, nurse, volunteer, therapist, etc.

- can be interspersed with non-person symbols according to complexity desired.

3. WHERE DO PEOPLE WORK?

Suggested symbols: teacher, doctor, dentist, policeman, nurse, my father, therapist, I work?

4. WHICH THINGS ARE HEAVY?

Suggested symbols: train, house, airplane, cupboard, television set, bed, tree.

- interspersed with other symbols.

5. WHICH THINGS CAN BE DANGEROUS? (Opposite of safe)

Suggested symbols: car, electricity, bus, scissors, fire, cutlery, light, needle, machine, glass, sun.

- interspersed with other symbols.

6. WHICH THINGS CAN MAKE A NOISE?

Suggested symbols: truck, bird, telephone, machine, car, taxi, television, music, thunder.

- interspersed with silent symbols.

7. WHAT IS MADE OF PAPER?

Suggested symbols: book, letter, page, envelope, parcel.

- interspersed with other symbols.

8. WHAT IS MADE OF CLOTH?

Suggested symbols: towel, dress, underwear, pants, coat, blouse, stockings.

- interspersed with other symbols.

9. WHERE DO WE NEED OUR EYES?

Suggested symbols: book, television, letter, street, communication.

- interspersed with other symbols such as eat, feel, hear, think.

10. WHERE DO YOU NEED YOUR EARS?

Suggested symbols: hear, television, telephone, music, thunder, communication, record.

- interspersed with other symbols.

11. CIRCLE THE BODY PARTS!

Body symbols.

- interspersed with other symbols.

12. CIRCLE THE FURNITURE!

Suggested symbols: desk, chair, table, bed, toilet, wheelchair, television, cupboard.

- interspersed with other symbols.

13. CIRCLE THE CLOTHING!

Suggested symbols: blouse, dress, coat, pants, socks, shoes.

- interspersed with other symbols.

14. WHAT CAN YOU FIND IN THE HOUSE?

Suggested symbols: television, telephone, light, room, door, window, floor, wall, stairs, cupboard, cheese, furniture, chair, table.

- interspersed with other symbols.

15. WHAT CAN YOU FIND OUTSIDE THE HOUSE?

Suggested symbols: tree, car, park, sun, moon, rain, thunder, wind, snow, airplane, bird.

- interspersed with other symbols.

16. WHAT BELONGS TO THE WINTER?

Suggested symbols: snow, coat, sweater, thunder, ice, wind, rain.

- interspersed with other symbols.

17. WHAT BELONGS TO THE SUMMER?

Suggested symbols: flower, grass, sun, insect, bird, park, rain, wind, lake.

- interspersed with other symbols.

18. CONSONANT DRILL (Circle the symbols that begin with S's)

Suggested symbols: store, stairs, sky, show, star, shoes, secret, smart, strong, special, say, sit, stand, sister, stranger, square, etc.

- interspersed with other symbols in simple or complex worksheet.

19. COMBINING (Give me a symbol for these words!)

Suggested symbols: wallpaper, fireman, classroom, school bus, music teacher, dressing table, mailbox, tail, lock, feather, newspaper, ruler, bicycle.

20. FILL IN THE MISSING SYMBOL! (sentences in symbols)

- (a) I _____ in my bed.
- (b) I want _____ a book.
- (c) I like _____ television.

- (d) I sit on a _____.
- (e) I go to school in the _____.

21. SYMBOL MEANING (Choose which symbol)

Symbols used: (1) keep, save; (2) safe

- (a) It is not _____ to go in a boat if you cannot swim.
- (b) If I want to buy a house, I have to _____ my money.
- (c) If I put my money in the bank it will be _____.
- (d) It is not _____ to go in a car without brakes.
- (e) Do you want to throw out these shoes, or do you want to _____ them?
- (f) I will _____ my sandwich for later.
- (g) Is it _____ to pet a lion?
- (h) Is it _____ to cross this road now?

#1-21 submitted by:
 Myrna Borst
 Peter Hall School
 Montreal, Quebec

WORKSHEET SUBMISSIONS

Instructors have submitted samples of worksheets which they have found useful. We include them in the following pages, for your interest.

1. Gross Discrimination
2. Concept - on, in, right, left- cut and paste.
3. Circle the least.
4. What is it made of?
5. Match the symbols. (Fine discrimination)
6. Match the opposites.
7. Reading Comprehension
8. Combine Strategy - (Find the symbol that names the picture)
9. Plural Strategy - (Find the small car, etc.)
10. Many Strategy

submitted by:

*Grace Skanes
Kitchener-Waterloo Rotary*

*Nancy Lageer
Ontario Crippled Children's
Centre*

*Myrna Borst
Peter Hall School*

1. GROSS DISCRIMINATION:

(Find two that are the same)

2. CONCEPT FORMATION:

(First session)

		
		
	cut and paste	 in
	 on	 under
	 left	 right

3. CIRCLE THE LEAST:

4. WHAT IS IT MADE OF?

book



glass



metal



plastic



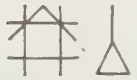
paper



cloth



window



dress



scissors



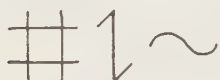
cutlery



letter



airplane

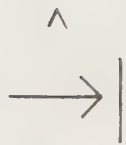
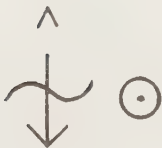
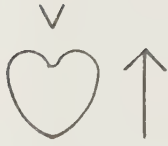
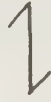


towel



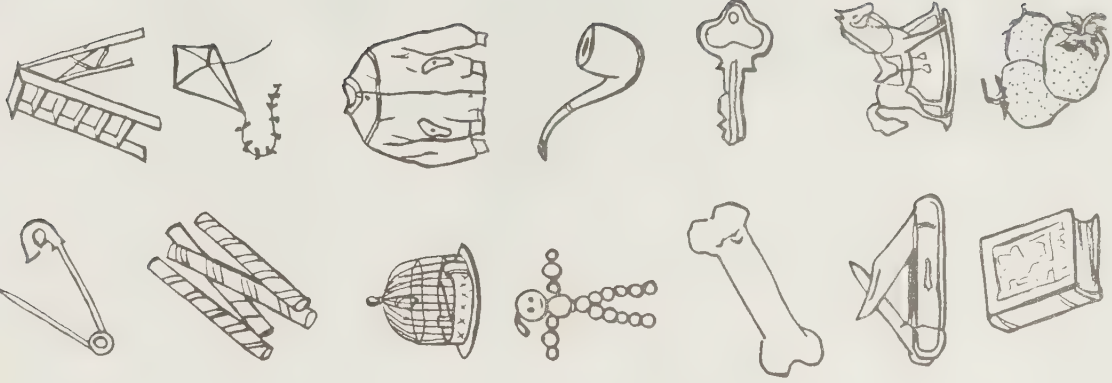
5. MATCH THE SYMBOLS:

6. MATCH THE OPPOSITES:

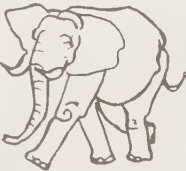
7. READING COMPREHENSION:

   	     	   	   	      	     	    
---	--	--	--	---	---	--



8. COMBINE STRATEGY:

Find $\sum^x$ that name the pictures

				
				
				
Combine - Several symbols are not on the displays.				

9. PLURAL STRATEGY - BIG & LITTLE:

<	○	<	□	>	I	x	⊖ [Ⓟ]
<	○	<	□	>	I	x	⊖ [Ⓟ]
<	○	<	□	>	I	x	⊖ [Ⓟ]
<	○	<	□	>	I	x	⊖ [Ⓟ]
<	○	<	□	>	I	x	⊖ [Ⓟ]
<	○	<	□	>	I	x	⊖ [Ⓟ]
<	○	<	□	>	I	x	⊖ [Ⓟ]
<	○	<	□	>	I	x	⊖ [Ⓟ]



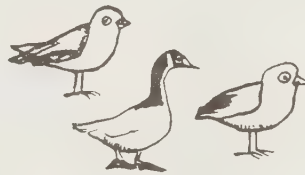
10. X MANY STRATEGY:

Find the Σ to name the picture. If there is more than one, use the plural indicator.

X



6



26¹
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B. Program Planning and Suggestions

INSTRUCTOR'S PLAN

BLISSYMBOL SYSTEM REPORT - Week ending _____

NAME:Theme for the week:Symbols reviewed:New symbols learnt:News given:Games played:Work with teacher:Liaison with home:Attitude to work:Any other comments:

Signed: _____

Date: _____

LESSON PLAN AND REPORT FOR VOLUNTEERS

NAME _____

DATE _____

SYMBOLS TO BE REVIEWEDSYMBOLS GIVING DIFFICULTYNEW SYMBOLSRequested by childIntroduced by VolunteerQUESTIONS AND DISCUSSIONCHILD'S ATTENTION AND INTERESTSUGGESTIONS FOR NEXT LESSONSymbolsStrategiesSPECIAL POINTS TO REMEMBER (Topics to pursue)

Cookie Sale: can be sponsored by Bliss class. Cookies, perhaps, could be made by parents. The sale could sponsor a local charity (Cerebral Palsy Association), school, fund, etc. Posters can be made for school in symbols and words. This could also lead to cooking project for the class incorporating symbols. The cookie sale could leave the school or centre and become a community project as well.

A Blissmastree: was made by the Bliss class at the MacKay Centre. A large Christmas tree was decorated with parcels, each carrying symbols for the gifts children might expect for Christmas. All classrooms in the school competed to translate the symbols on the boxes. The Bliss class issued certificates of merit to each class that successfully named all items.

Bulletin Boards: throughout the school or centre can carry symbol/word displays. They can be amusing (riddles, jokes), seasonal (holidays), weather boards, carry a secret message, news, teach telling time in Bliss, etc. Such boards could be used in the classroom and then moved to a "community" area, where they could provide general information to speaking students, visitors, volunteers and staff.

INVITATION TO MEETING



Dear Parents:

WE HAVE OBTAINED THE MOVIE -

"MR. SYMBOL MAN!"

This is a 50 minute movie about the Blissymbol Communication System - about Charles Bliss, the man who created the system, and about the use of the system with physically handicapped children at the Ontario Crippled Children's Centre.

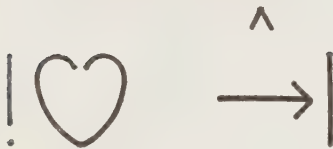
It may be of general interest to all parents of physically handicapped children, and of specific interest to those parents of children using the Bliss System.

TO BE SHOWN:

FEBRUARY 3rd

- 10:00 a.m. at the Cerebral Palsy Centre
- 12:00 noon and 3:30 p.m. at the Nash Lecture Hall, Chedoke Hospital.

PLEASE COME.



submitted by:

Lynda Archer, Speech Therapist,
Hamilton District Society for
Crippled Children,
Cerebral Palsy Centre.

QUESTIONNAIRE FOR PARENTS OF CHILDREN
IN THE COMMUNICATION CLASSES
DEVELOPED AT ONTARIO CRIPPLED CHILDREN'S CENTRE
(translated into Portuguese & Italian)

We are looking for areas of common concerns among the parents of children in our communication classes. Would you help us by completing this questionnaire?

Please return after you have completed as much as you feel is appropriate in your situation.

1. Would you like contact with the school about your child's

Education _____

Physical Therapy _____

Speech Therapy _____

Other _____

2. How frequently would you like this contact?

Weekly _____

Every other week _____

Monthly _____

Less frequently _____

When?

Daytime _____

Evening _____

Weekends _____

3. (a) Check all the types of contact you like.

School visits _____

Clinics _____

Home visits _____

Letters _____

Telephone calls _____

Parent group meetings _____

Daily notebook _____

Other _____

(b) List the ones you have checked above in the order you prefer.

(1) _____

(2) _____

(3) _____

4. What is your major concern about your child's development?

5. In what language do you want your contacts? _____

6. Do you have contact with parents of handicapped children?

(a) Frequently _____

(b) Sometimes _____

(c) Never _____

Do you have contact with parents of symbol users?

(a) Frequently _____

(b) Sometimes _____

(c) Never _____

7. What do you expect for your child in the future in the way of communication?

Is this the same or different from what professionals have told you?

Same _____

Different _____

8. Would you like:

(1) More printed information about symbol use _____

(2) Workshops in the symbol system for parents _____

(3) Training in communication with symbols _____

(4) Would you like us to plan an informal evening at school with parents of other symbol users? _____

Other comments: _____

APPENDIX 8

COMMERCIALLY AVAILABLE AND TEACHER-MADE MATERIALS

AND

OTHER SOURCES OF INFORMATION

pages 369 - 396

A. Commercially Available Material

The following group of items is available from:

Developmental Learning Materials (DLM)
7440 Natchez Avenue, Niles, Illinois 61648

ASSOCIATION PICTURE CARDS I and II: DLM # P. 124 & P. 156

Description:

Group I consists of six sets of pictures of houses, trees, clocks, chairs, tables and lamps. In Group II the six classes are hats, boats, dogs, cars, trucks and birds. Each set contains five different kinds of each object pictured.

Possible Symbol Adaptations:

The cards in both sets provide an excellent means to drill beginning symbol users on basic symbols. Mix up the sets of pictures and show the child a card. Have him point to the corresponding symbol on his Bliss board or select from a choice of symbol flash cards. Children respond well to this type of drill and the pictures are colourful and interesting.

BUILDING MATCH-UPS: DLM # 320

Description:

This set consists of eight large master cards with a picture of a specific building on each and 48 small cards, six of which are to be appropriately matched with each building. For example: Grocery Store (large card)

- cashier
- fruits
- canned goods
- dairy foods
- meats
- bread

The child is to match the six appropriate cards with each of the eight buildings.

Symbol Adaptations:

This set provides an excellent exercise in combining symbols. The children can be asked how they would name each building and the six matching cards using combined symbols.

CATEGORY CARDS: DLM # 231

Description:

The set contains 45 cards which can be divided into nine categories of five cards each. The categories are health aids, shapes, fruits, clothes, vegetables, tools, sports equipment and fixtures (household).

This game can be played like "Go Fish" whereby the child attempts to make a "book" consisting of five cards of the same category. Each player receives seven cards -- the rest are stacked in the center of the table. One player asks another for a card of a specific category or even for a specific card, i.e. "Do you have a vegetable?" or "Do you have the celery?" If not, the player must draw from the stack on the table. The player who completes the most books wins.

Symbol Adaptations:

All the cards can be labelled with symbols if so desired because there is sufficient space on each card and the game can proceed as above using the Bliss board to request specific cards. This game provides an excellent opportunity for teaching the question strategy.

- OR -

The cards do not have to be used to play a card game at all. Symbols representing the nine categories can be shown

and the child must sort the cards into the appropriate category. In this case cards would be labelled with symbols.

LOGIC CARDS: DLM # 241

Description:

There are thirty-two cards in this set which can be divided into eight sets of four each. Each set depicts a series of activities which can be placed in a logical order to make a story.

Symbol Adaptation:

The child can be called upon to place the cards in a logical sequence but after having done this, he must explain the actions or tell a story using Blissymbols. The task can be adapted for younger symbol users by reducing the sequence to two or three of the cards.

OPEN SEQUENCE CARDS: DLM # 313

Description:

Open sequence cards consist of eighteen different incomplete sequencing situations divided into five sets. The sequencing tasks vary in degree of difficulty depending upon the number of parts missing from each sequence. The child is asked to either place loose cards in proper sequence or fill in a card or cards to complete a sequence.

Symbol Adaptations:

This activity provides reading readiness practice by stressing left to right orientation. The child can use his symbols at a basic level to label what he sees in each picture or at a more complex level he can complete the

sequence and tell a story using his symbols. This provides good practice in making complete symbol sentences.

PHOTO SEQUENTIAL CARDS: DLM # 325

Description:

This series consists of four photo sequences of six cards, each depicting four different events:

1. A woman and child taking an airplane trip.
2. A man working in a print shop.
3. Two teenagers on a shopping expedition.
4. The school day activities of a teenage boy.

The child must place the cards in proper sequence and describe the action. These cards appeal more to the older student because of the subjects. They help enhance visual-sequencing skills and descriptive language skills.

Symbol Adaptations:

After properly sequencing each series the Bliss child can use symbols to tell each story and note the details in each picture.

SEQUENTIAL PICTURE CARDS II: DLM # P. 161

Description:

This set consists of ten picture sequences of three cards each. One of the sequence series depicts a foot on the first card, a related object -- a shoe on the second card, and the foot in the shoe on the third card. Cards one and two must be described with nouns and card three requires a descriptive verb or preposition.

Symbol Adaptations:

These cards can encourage approximation of English syntax by requiring that the child enlarge symbol responses from simple nouns to nouns and verbs or nouns and prepositions.

SEQUENTIAL STRIPS: DLM # 376Description:

These are folding sequential stories without words. The subjects are Making Pizza, Eating Out, Fish for Breakfast, and My Special Friend. The child is to describe the action in each sequence.

Symbol Adaptations:

The child can describe the actions using Blissymbols. Depending upon the level of symbol proficiency the teacher can require complete sentences in the descriptions.

AUDITORY TRAINING -- FAMILIAR SOUNDS: DLM # T. 139Description:

This kit features a cassette recording of fifty familiar sounds, i.e. a telephone ringing, cars honking, water being poured into a glass, along with a picture card for each sound.

Symbol Adaptations:

This provides good auditory training whereby the child must listen to each sound and point to the symbol which best describes each sound. If a child cannot identify the sound, the picture card can be shown, and he can use this visual cue to locate the appropriate symbol.

The following items are available from:

Teaching Resources - A New York Times Company
100 Boylston Street, Boston, Mass. 02116
(Canadian Distributor: Ginn and Company,
35 Mobile Drive, Toronto, Ontario M4A 1H6)

PARTS OF SPEECH:COMPLETE: Catalog # 84-100

Description:

This set consists of five decks of picture cards depicting nouns, verbs, adverbs, adjectives and prepositions.

Symbol Adaptations:

Bliss children can match the cards with symbol phrases containing the appropriate parts of speech.

FELT BOARD KITS:

The following felt board kits manufactured by Instructo Corp., Paoli, Pa. (a subsidiary of McGraw-Hill) have been successfully adapted and used with symbol children. We have made separate cards (bristol board with felt pieces glued on the back) with appropriate symbols for each kit.

We Dress for the Weather: Instructo # 285

This is an excellent kit for teaching weather, clothing, and days of the week symbols. Pieces are large and brightly coloured.

Opposite Concepts: Instructo # 33

This kit contains fifty-six pictures which group into twenty-eight opposite concepts. This is good for teaching the opposite strategy.

Things a Family Uses: Instructo # 111

This kit contains seven illustrations of people, individuals and groups -- the child must classify over fifty items according to who would make use of them. This is an excellent resource to reinforce the combining strategy because many of the items listed cannot be described with one symbol.

My Face and Body: Instructo # 284

This kit contains forty-nine pieces by which the teacher can teach the various body parts symbols.

The Arithmetic Readiness Vocabulary: Instructo # 27

This kit contains felt pieces and corresponding math words such as small, smaller, smallest, many, few, more, right, left. Symbols representing these concepts can be taught using this kit. For example:

$\checkmark$  small	$\checkmark$  smaller	$\checkmark$  smallest
--	--	---

STORIES:Three Billy Goats Gruff: Instructo # 162

This kit contains a cassette recording and felt board pieces which depict the story. Symbol pieces can be made to correspond to the picture pieces. For example:

$\checkmark$  Big Billy Goat	$\checkmark$  Middle Billy Goat	$\checkmark$  Little Billy Goat
---	--	---

Children love listening to the story and matching symbols to the pictures. This is an invaluable resource for children

with short attention spans because the music and voices are dramatic and entertaining.

* The following stories do not have accompanying cassettes but it would be easy enough for teachers and volunteers to make them.

The Three Little Pigs: Instructo # 152

Goldilocks and the Three Bears: Instructo # 154

Gingerbread Boy: Instructo # 155

Little Red Riding Hood: Instructo # 156

ANIMAL FACE PUPPETS: Instructo Kit # 1189

Six sturdy cardboard face puppets are included in this kit. This is an excellent vehicle for teaching Bliss children to make up stories using their symbols. Entire plays can be written by the more sophisticated symbol users. They also provide an excellent starting point for discussion of each animal and its habitat. Children can combine symbols to name each one -



Monkey

Also available are Fun With Faces: Family Face Puppets (White - Instructo # 1185; Black - # 1186). Family symbols can be taught in the same way.

UNDERSTANDING OUR FEELINGS: Instructo # 1215

This series contains twenty-eight photo cards depicting various emotions. These can be used to teach and reinforce

the emotion symbols. Similar pictures have also been cut from magazines, enabling the beginning symbol-user to make simple labels or sentences to describe the appropriate emotion. They can be put in notebook form, which the child can read again and again.

WOODEN PUZZLES: (See Appendix 6 A)

Wooden puzzles are an excellent aid to teaching symbols to the beginning symbol-user. Pieces are large and easily manipulated by many physically handicapped children. Symbol labels can be taped or glued on the underside of each puzzle piece. Simplex, puzzles which are manufactured in Holland and generally available at educational toy stores, are outstanding.

Farm: Simplex # 1202

Stand Up Pieces: Simplex # 1180

We also have:

Community: Fisher-Price # 502

and

Lauri-Junior Fit-A-Space: # 2101, Lauri Inc. Phillips-
Avon, Maine

This is a rubber puzzle which contains basic shapes that can be labelled with appropriate symbols.

TEXTBOOKS

In searching through various textbook series the following aids were selected because of their adaptability for use with symbol children. They are published by:

Methuen Publishing Co.
2330 Midland Avenue
Agincourt, Ontario M1S 1P7

Many of the books in the Methuen series are excellent: they have interesting pictures, short sentences (which can be translated into symbols), abundance of space above the words and inexpensive price.

DO YOU KNOW WORD BOOKS by June Melser

Set A ME 423 73100 9
Set B ME 423 88310 0

Set A contains eight small paper books entitled The, A, Little, My, And, See, Big, In. The titles in Set B include Said, Too, Come, Me, For, You, We, With. All the symbols for these words are included on the 400 display, and they are reinforced because they appear on each page.

READ IT YOURSELF by June Melser

ME 423 86510 2

Set A contains eight titles in which the simple phrases can be translated into symbols. The titles include:

What is Little?

What Can Jump?

What is Big?

What Goes Up?

What Goes Fast?

What Can Fly?

What Comes Down?

What Goes Round and Round?

If the sight word (as opposed to or in conjunction with the phonics) method is being employed with your symbol student, sentences can be translated into symbols and words can be gradually substituted for symbols.

INSTANT READERS by Dorothy McMillan

ME 423 49470 8

This is an invaluable set of twenty-four small paper books illustrated with black-and-white photographs. A large teacher's edition is available for group reading lessons: ME 423 49460 0.

As may be seen by the following sample titles, these books are excellent for introducing and reinforcing symbols and also for developing a sight word vocabulary: Me, My Family, Big Brother, Big Sister, Pets, After School, Baby, Mother, Father are just a few.

Purple Books - 4 books ME 423 77570 7

Orange Books - 4 books ME 423 77580 4

These two series contain stimulating titles such as Funny Fishes, Rock Pool, Boats. Each title is written partly in story form and partly in rhyme. There is abundant space for placing symbols above the words or covering words with symbol sentence strips.

METHUEN NUMBER-STORY CAPTION BOOKS by Beverly Randell

Set A ME

Set B ME

Each set contains four titles which can be used in conjunction with the Bliss board to reinforce concepts and teach symbols.

Set A includes:

Huge and Tiny

High and Low

Too Large and Too Small

Over and Under

Set B includes:

Less and Less

Fewer and Fewer

Heavier and Heavier

Further and Further

Set A can also be used to reinforce the concept of opposite.

TELLTALES: Picture Stories for Language Enrichment by
Denis and Judy Gahagan ME

Set I: Simple Actions:

This series contains eight sets of four cards, each of which depicts a single event. Pictures are colourful and attractive though possibly too detailed and confusing for the beginning symbol user. The child can relate each story using his symbols.

The next item is available from:

Three Four Five
33 West Hill
London, England SW 18 1RB
(Distributed by: Kiddiecraft Ltd.
Kenley Surrey, England CR 2 5YS)

MAKE-A-STORY IN THE TOWN:

This sturdy book contains a series of flip-over pictures which can be used to tell many different stories. The child can relate what he sees in symbol form. The book can be used at the beginning level for picture-symbol matching exercises and at the more advanced level to make up symbol stories.

The following book is available from:

Random House
New York or Toronto

BIG AND LITTLE by J.P. Miller

0 394 83239 6

This sturdy cardboard book contains ten brightly illustrated pages. It helps teach and reinforce the opposite concepts -- short-tall, fat-thin, few-many, over-under. It was purchased in the book section of a large department store.

The following series is available from:

Bowmar Publishing Co.
622 Rodier Drive
Glendale, California
- or -
Thomas Nelson and Sons
81 Curlew Drive
Don Mills, Ontario
(Canadian Distributors)

THE MONSTER SERIES:

This series of twelve textbooks with simple stories can be translated into symbols for the more advanced symbol user or used to teach listening and comprehension skills to any symbol user. Children love the amusing stories and humorous illustrations.

The following series is available from:

Building Stories with Jack and Julie
St. Johns School for the Deaf
Milwaukee, Wisconsin 53207

JACK AND JULIE SERIES:

This series of wordless cartoon pictures is designed to develop receptive and expressive language in deaf children. Simple or complex symbol sentences can be

devised by the child or the teacher to describe the action in each four to five card series. A typical lesson with these cards might include a lesson on combining to develop a story vocabulary, a description by the child of the depicted actions, reading of the aforementioned symbol sentences, and matching the sentences to the pictures. (Sentences can be written on paper or cardboard strips for the matching exercise.) Finally, the pictures can be mixed up and the child required to place the story back in sequence.

The following books are available from:

Science Series
MacMillan Publishing Co.
70 Bond Street
Toronto, Ontario
also in New York

SEE HOW IT GROWS by Pamela Nash

The Seed SBN 333 12184 8

The Bulb SBN 333 12182 1

The Tree SBN 333 12187 2

These sturdy, brightly illustrated paper books contain brief explanations on each page which can be translated into Blissymbols. These books can form an integral part of a science unit on plants.

The following books are available from:

Western Publishing Co.
Golden Press
Racine, Wisconsin
also in New York

AN ANIMAL SHUFFLEBOOK 15770

This packet of brightly illustrated cards contains pictures of animals on one side and pictures of actions on the reverse side. They can be shuffled to make amusing

stories. Cards can be translated into symbols or children can use them as a stimulus to relate imaginative symbol stories. Children can also receive practice in combining symbols by naming the different animals and their actions.

B. Teacher-Made Games and Activities

BLISSYMBOL BINGO:

Number of Participants: Two or more

Materials Needed:

1. Cards ruled into nine squares (three by three) with a different symbol drawn in each square.
2. Separate master symbol cards for each symbol used in the game.
3. Tokens to cover squares.

Method:

The game proceeds like a typical Bingo game -- the first child to get three symbols down, across or diagonally wins.

Variations:

This game can be employed to teach various strategies -- opposite, plural, combining, etc.

Field Test Results:

Children seem to really enjoy this game. It is good for increasing attention span, teaching symbol discrimination (put similar symbols on your cards) and encouraging group participation.

ALL ABOUT ME BOOK:

Number of Participants: All class members (teacher too!)

Materials Needed:

1. A large photo album (preferably the dry mount kind).
2. Photos of all the children in the class (and teachers) their families, special family occasions, pets, etc.

Method:

Send home a questionnaire at the beginning of the school year asking for information about each child such as family members, birthdate, pets, favourite T.V. programs, favourite foods, etc. Write this information on cards and place these in the book album along with the pictures. Make up or have each child make up simple sentences to explain each picture.

Field Test Results:

Though the books were originally made for teachers and volunteers, in order to familiarize them with the children quickly, the children were fascinated (and continue to be fascinated) by the book. They will sit and look at the pictures and read the sentences over and over again. One may choose to begin by taking pictures of class field trips and parties.

BUILD-A-STORY :

Number of Participants: All class members and teachers.

Materials: Symbols

Method:

The teacher or a class member starts a story and class members add to it using their symbols. The teacher can write the story on an experience chart or blackboard.

LISTENING FOR DEFINITIONS:

Number of Participants: Individuals or all class members.

Materials: Symbols

Method:

The teacher gives verbal clues such as "I am thinking of something made of wood. It has four legs. We sit on it. It is a _____. " The child supplies the missing symbol.

BUILD A SYMBOL WALL:

Number of Participants: All class members or individuals.

Materials:

Search through wallpaper books to find simulated paper bricks.

Method:

For each new symbol that is learned, paste a new "brick" marked with that symbol on the wall.

Field Test Results:

This is an excellent activity to motivate beginning symbol-users.

SYMBOL SCRABBLE:

Number of Participants: Two or four players.

Materials:

Individual symbol cards (eight or more depending upon the level of the child) with various point values assigned to each.

			
she	man	see	the

Method:

Each child tries to make a symbol sentence using their cards. The one with the most points in his sentence wins.

TENSES:

Number of Participants: Two or three advanced symbol-users.

Materials:

Five sets of symbol cards -- three for each verb chosen -- with the past, present and future tenses.

		
saw	see	will see

Method:

Each child receives five symbol cards, the rest are placed face down on the table in a pile. The child must make a "book" of the three tense cards. Going in a clockwise direction the symbol child indicates on his Bliss board the card he would like, i.e. , if no one has it he

⊙

saw

can take the top card from the pile of leftover cards. At the end of the game the child with the most books wins.

BODY PARTS GAME:

Number of Participants: One or more.

Materials:

1. Large body parts symbols cut from cardboard or styrofoam meat trays.
2. Dice with a different body part symbol drawn on each face.

Method:

Child rolls the dice and picks out the body parts which appear. The first child to complete a person constructed out of symbols wins the game.

Field Test Results:

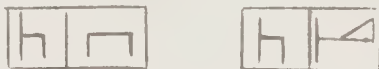
This is an excellent way to teach or reinforce the body parts symbols for the beginning symbol-user. It can be used in conjunction with the My Face and Body kit (see p. 382).

SYMBOL DOMINOES:

Number of Participants: One or more.

Materials:

Sets of cardboard dominoes with symbols in each end. Fifteen or twenty dominoes to each set make a good game.



Method:

Pass out five dominoes to each player. One domino is placed in the center of the table, the rest of the dominoes are placed face down and mixed up on the table. The child matches the end of one of his dominoes with the end of the one on the table. If he cannot, he draws from the mixed-up pile. The first child to get rid of all his dominoes wins the game.

Field Test Results:

This is an excellent game for the teacher to make using stencils. Duplicate the sets of dominoes and send them home with your symbol children.

BLISSESTRATION: CARD GAME

Number of Participants: Two or more.

Materials: Pairs of symbol cards (five to ten per set).

Method:

There are many variations of this game. One can make up decks of cards, mix them up, place them face down on the table and each player takes turns turning up two cards at a time. If the two match, he gets to keep them, if not he places them face down in the same place and all players try to remember their positions. Game continues until all pairs have been made. The player with the most pairs wins the game.

Field Test Results:

This is another game which can be easily reproduced on a stencil and sent home for the children to play with family and friends. It is a good game for teaching visual

discrimination, and reinforcing new symbols. If you wish to reinforce new strategies, make up sets of cards using plural, combining, opposite, etc. strategies.

DRILLING OPPOSITES:

Number of Participants: Entire class or individuals.

Materials: Symbols

Method:

The teacher holds up a symbol and the child points to the one that is the opposite.

Field Test Results:

During drill exercises the children enjoy contests, the boys vs. the girls or one-half the class vs. the other half.

WHAT IS WRONG:

Number of Participants: All class members or individuals.

Materials:

1. A simple story (four to five sentences) written in symbols. Each sentence should be written on a separate cardboard strip.
2. An extra sentence which does not belong in the story -- one which does not make sense.

Method:

The teacher shows the child each sentence and he has to determine which does not fit with the rest of the story.

Field Test Results:

This is an excellent way to check whether or not a child actually comprehends the symbol sentences. Do not say the words to the child, just show him the symbol strips and see if he can pick the one that does not belong on his own. Then read the sentences aloud at the end to give aural feedback.

ALL ABOUT ME:

Number of Participants: Individuals or all class members.

Materials: Symbols

Method:

Ask children to answer questions similar to the following using their emotion symbols. Which symbol tells how you feel when:

1. A baby sitter is coming.
2. You have opened a present you love.
3. You are having cauliflower (peas, spinach) for dinner.
4. You haven't completed your schoolwork.

SYMBOL DRAW:

Number of Participants: Unlimited

Materials:

Symbol cards for symbols on the 100, 200 or 400 displays.

Method:

Place the pile of symbol cards on the table in front of the child. Teacher, volunteer or child draws one card at a time. If the child can locate it on the symbol board, he gets a point.

Field Test Results:

This is a good exercise to reinforce visual memory skills or practice locating recently learned symbols.

SYMBOL SCAVENGER HUNT:

Number of Participants: All class members.

Materials:

1. Symbol labels for various objects around the room or school.
2. A check list of all these symbols.

Method:

Label objects about the room or school with symbols. Give each child a list of symbols (or combined symbols) to locate. Give each child a list of different symbols to locate -- he can be paired with a volunteer if he needs help. The first child to locate all the symbols on his list wins the hunt. The volunteer can verify the location of the objects.

BLISS LAND:

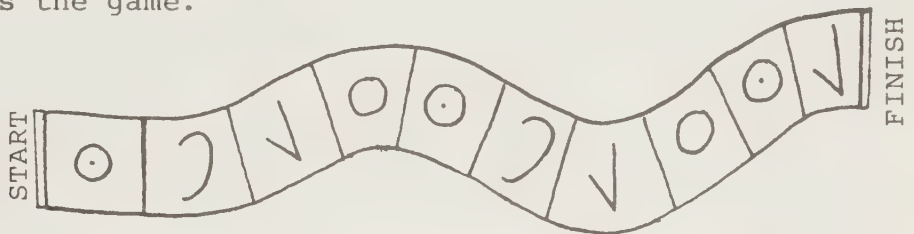
Number of Participants: Two or more.

Materials:

1. Make a game board similar to the one below. Choose six or seven symbols for each game and place them in each square. Make sure they repeat four or five times.
2. Make small separate cards which have these same symbols written on them. Make four or five of each symbol.
3. Tokens for each child.

Method:

Place the separate game cards face down. Children take turns drawing a card and moving to the square shown on the card. The first player to reach the end of the board wins the game.

Field Test Results:

One may make several copies of this game and choose a different theme for each. The different games include body parts, goods, weather symbols, furniture, etc. We include blank cards in each deck, if the child draws a blank, he misses his turn. If a child lands on a space that is occupied by another player's token, he sends the player back three spaces.

TIC-TAC-TOE :

Number of Participants: Two

Materials:

1. Empty tic-tac-toe grids (3 spaces by 3 spaces).
2. A stack of symbol cards for each player. Each player has the same symbol on all his cards.

Method:

The game proceeds like tic-tac-toe. The first player to get three symbols in a row, down, across or diagonally wins the game.

HAND PUPPETS :

Number of Participants: One or more.

Materials:

1. Simple hand puppets.
2. Velcro tape.

Method:

Dramatize situations or stories using the symbol puppets. This is a good way to teach the beginning symbol-user the family and people symbols. To change the character simply put your symbols on velcro tape and they will be interchangeable.

POSTERS :

Posters can be used to practise making symbol sentences in large groups. Children can describe what they see in each poster and the teacher can label the posters with symbols accordingly.

WOODEN SENTENCE BLOCKS :

Number of Participants: Individuals

Materials:

1. Small (2" x 2") wooden blocks with subject and verb symbols written on them.
2. Magnets.
3. Magnetic boards.
4. Picture cards of people performing different actions.
The parts of speech cards are excellent (see p. 381).

Method:

Make a sentence for each card you use. Use two or three blocks for each picture. Give the child a packet containing five picture cards and ten or fifteen wooden blocks. Have him match the blocks with the pictures and put them in correct sentence form.

Field Test Results:

Most children found this task easy to perform. It reinforces sentence reading and sentence making skills.

*submitted by:
Claudia Chant
Symbol Teacher
MacKay Centre
Montreal, Quebec*

C. Other Sources of Information

1. Book-Aids for the Severely Handicapped
 Edited by Copeland, Keith, 1976
 Grune & Stratton Publishers
 111 Fifth Avenue
 New York City, N.Y. 10003
 U.S.A.
2. Borden, J. "Furniture for the Schoolroom," Special Education, Vol. 59, Sept. 1970.
3. Carba-Linguaduc Program re: Interfaces mentioned
 (Switzerland) in Physical Functional Considerations section,
 e.g. page turners.
 Work only with Mid-Canada Medical.
4. Carroll, J.B. "The case for ideographic writing,"
Language by Ear and by Eye, Kavanagh and Mattingly
 (eds.), Cambridge, Mass.; MIT Press, 1972.
5. Electronic Equipment for the Severely Disabled
 c/o Mr. Roger Jefcoate
 Consultant, Assessor and Lecturer
 Willowbrook, Mursley
 North Buckinghamshire MK17-0JA
 England
6. Equipment for the Disabled: Communication
 Edited by Wilshire, E.R. et al, 1971
 National Fund for Research into Crippling Diseases
 Vincent House
 1A Springfield Road
 Horsham, Sussex, England
7. Kafafian, H. Study of Man-Machine Communications Systems for Disabled Persons, Vols. I, III, VI & VII,
 Washington, D.C.; Cybernetics Research Institute Inc.,
 June 1971.
8. Karnes, M.B. et al., "The Effects of Typing Instruction on the Personality and Achievement of Educable Mentally Handicapped Children," Illinois; Champaign Community Unit 4 School District, August 1963.

9. Mid-Canada Medical re: All wheelchairs
1270 Crestlawn Avenue mentioned in Physical
Mississauga, Ontario Functional Considerations
L4W 1A6 section.
10. National Research Council of Canada
c/o Dr. W.G. Schneider, President
Montreal Road
Ottawa, Ontario
K1A 0R8
11. Prentke Romich Co. re: An electronic aid - The
R.D. 2, Box 191 Bliss Symbol Scanner.
Shreve, Ohio
44676
12. SICOM re: Head Mounted Wand,
c/o Mrs. Carmelita Heiner approximately \$60.00.
7545 Whitlock Avenue
Playa Del Rey, California
U.S.A. 90291
13. Tape Switch Corp. of re: Air wave switch (type DW20
America Model AW), approximately
320 Broad Hollow Road \$20.00.
Farmingdale, N.Y. 11735
U.S.A.
14. Tri-Chem re: Fabric for portable
21 Progress Street display unit.
Toronto, Ontario
15. Word Making Productions, re: Coloured stickers for
Inc. making language and
P.O. Box 15038 communication materials.
Salt Lake City, Utah
U.S.A. 84115
16. Veri-Tech Materials re: Teaching aids.
c/o Louise Paré
Ecole Victor Doré
1350 Cremazie E.
Montreal, Quebec

APPENDIX 9

EXTENSION INTO THE COMMUNITY

pages 397 - 412

A. Help for the Listener

Hello. My name is Nikki.

I have Cerebral Palsy, so my muscles don't always do what I want them to do. My brain is not handicapped, so I have many important things to say.

You can ask me questions just like you would any other 5-year old girl. I will answer by pointing to my blocks or to the Blissymbol on my communication board. It is colour-coded so that we can both find things faster.

Colour adjectives are across the top of the board.
Pronouns and human nouns are in yellow; also words dealing with our senses.
Verbs are in green.
Adjectives, prepositions are in blue.
Object nouns are in pink.

Because I have not used my symbol board very long, my speech therapist, , helps me by putting her finger on each section or (Copie) symbol when she talks.

LIKE:

"Nikki, do you want to talk about a person (yellow); or something you want to do (green); or something else (pink)?"

then if I point to  or , Copie will say, "Oh, you are hungry!"


eat


drink

and she can flip to the food, drink chart so I can tell her what I want. (As you can see, I am not ready for many symbols yet, so Copie is still using pictures.)

On the back of my board are some symbols which can be used for games. I don't know these very well, so I will need lots of practice. Turn the pages of books with me, and we can put things in their categories. For example, you can point to something, and I can tell you if it is a


person

,


animal

or


container

We all need lots of practice in learning how to think about things in symbol form: Copie says nobody is ever wrong in symbol language, because everybody thinks about things differently; like: a chest of drawers can be



Copie is just learning about symbols too, so if you all will write down the things that I need most to communicate, Copie will try to find the symbols for them.

Nikki

These instructions for the listener may be tailored to the style of each child to indicate:

- (a) his age;
- (b) his method of pointing;
- (c) the layout of his display; and
- (d) his operating use of symbols (i.e. level).

A. submitted by:

D. Copie Davis
The Clark County Board of
Mental Retardation
2430 Van Buren Avenue
Springfield, Ohio

based on an idea from

B. Vender
Julia Molloy Education
Centre
8701 Menard Avenue
Morton Grove, Illinois

B. Techniques for Talking with Symbol-Users

1. First establish which hand and then which finger the child uses to point out (target) the symbols.
2. Gain an idea of the child's range of movement and targeting ability. Ask the child to point to the four corners of the board and to the lower middle of the board. Also ask the child to point to a specific symbol and observe the accuracy of the child's targeting ability.
3. Establish a method of indicating "yes" and "no". Ask the child which of the following methods he would like to use:
 - (a) a verbal "yes" and "no";
 - (b) pointing to yes and no symbols;
 - (c) pointing to the yes-no sides of the board;
 - (d) eye pointing;
 - (e) head shaking.

Often a child will use a combination of these methods, such as raising the eyes for "yes" and shaking the head for "no".

4. Avoid asking questions that can be answered with "yes" or "no". Previous to having Bliss symbols, most questions directed toward the child only required this simple response. Now that the child has a method for communicating, more complex thoughts and questions should be guided towards eliciting more information.
5. If a child appears to be uncertain of how to express a thought, encourage him to guess. Guide him in pointing out a description of the idea. For instance, you might ask:

"What is the purpose of your idea?" (Does it have anything to do with transportation, food, clothing, home, hospital, school.)

"Who uses it or who is involved with it?"

"Is colour important? Size?"

"What sound does it start off with?"
6. How to identify a poorly targeted symbol:

The burden of precise targeting becomes the responsibility of the listener or receiver of the information. The child will point to the general area of the symbol and

then the receiver must use one of the following methods to pin-point the desired symbol.

- (a) The symbols are colour coded. Ask the child to identify the colour of the desired symbol. "Is it the green one you want?"
- (b) Often the symbols are divided into quadrants by thick black lines. The child will indicate the desired symbol by pointing to the quadrant where the symbol is located. Then you, the receiver, must pin-point the symbol for the child, generally by scanning the symbols with your fingers.
- (c) Finger scanning can be used by itself, or in a combination with any of the other methods, and hence it is the most widely used method for identifying a poorly targeted symbol. After a child has located the general area, the receiver further pin-points the symbol by determining the row the symbol is in and then pointing to each symbol in the row until the desired symbol has been found.
- (d) A child may rely on eye pointing or directing his gaze towards a specific area when he is unable to target within the area. Often eye pointing is used in combination with other methods.
- (e) Some children may find it easier to locate and focus upon a symbol when the other symbols are covered by a sheet of paper. After the child has targeted to the general area of the symbol, the receiver takes one or two sheets of paper and covers the individual symbols so that only the targeted area is left exposed. The receiver then asks "Can you see it now?" If the answer is "yes", the paper is moved to cover a row of symbols and the question is asked again. This proceeds until the symbol row has been located. Then the receiver finger scans until the symbol is pin-pointed.

This method is particularly helpful with those children who have perceptual problems.

- 7. Check to ensure that the child is sitting comfortably with his head as upright as possible. Also check that his board is securely attached to his chair.
- 8. Where you sit when talking with a child depends upon convenience, space and practicality. Some children, especially those with athetosis, have flailing arm movements and it is best not to sit at their side. A suggested way that will help to promote good eye contact and proper seating posture (which may consequently facilitate more accurate targeting skills) is to sit directly facing the child.

9. Give the child time to think of and make his response. Do not interrupt with another question unless it is apparent that the child needs additional information or guidance before he is able to respond,

B. *submitted by:*
Bloorview Childrens Hospital
25 Buchan Court
Willowdale, Ontario

C. Special Vocabulary for Special Uses

Special vocabulary symbols can be created for special times and experiences by combining symbols or adding new symbols when needed. A camp experience, for instance, could elicit such new words for communication as:

camp, cook-out, swimming pool, horse, surf-board,
water skis, fishing rod, worm, guitar, ukuleles,
loon, seagull.

Initial consonants can be used to specify a particular kind of animal, food, flower, tree. Encourage your child to represent, by word list or picture, all the things which can be indicated by the same symbol.

e.g.  C can mean - cow
chipmunk
cougar
chinchilla

Remember CAT is a pet beginning with C:

  C

New words can be placed in a photo album with vinyl covered mounting pages and used at camp, for example, taken on trips, etc. It will probably be helpful to arrange new words alphabetically and within categories, but the "owner's" interest and needs will help you to decide the best manner of display.

(c) submitted by:
Ontario Crippled Children's
Centre
Toronto, Ont.

D. Camp Questionnaire
(for non-speaking children)

NAME:

AGE:

ADDRESS:

PHONE:

COMMUNICATION

Symbol Board	100	200	400
--------------	-----	-----	-----

Camp Board

Does the child indicate YES and NO?

How does he/she do this?

Does your child have any speech? Please explain.

How does child use the symbol board?

Points with finger

which finger?

Points with knuckle

which knuckle?

Eye pointing with frame and numbers

Eye pointing directly to board

Is child totally dependent on symbols for communication?

FEEDING

Does the child need help with feeding? Explain briefly,

1. No help
2. Partial help
3. Total help

Which foods are most difficult for child to eat?

Which foods are easiest for child to eat?

Which are your child's favourite foods?

Which foods does your child dislike?

Does the child

1. bite into foods
2. prefer to be fed small pieces

Is the child fed with a spoon?

large spoon small spoon special spoon

Does the child bite on a spoon?

Does the child's tongue push food out of mouth?

Drinking

About how much fluid does you child drink in an average day?

Can the child hold a cup?

Does the child drink from a

special cup ordinary cup flexible plastic cup

Does he/she use a straw?

What does he/she like to drink?

What does he/she not like to drink?

Do you hold child's head for feeding and drinking?

Please explain your method.

Do you feed child from the

front left side right side

Do you place the cup or spoon

over the tongue
between the teeth
between the lips

TOILETING

Does your child use a regular toilet?

If not, please explain child's special needs.

Does child sit facing the wall?

Does child sit facing away from the wall?

Does the child need to be held at all times?

Does the child prefer to be flexed forward

held upright

How do you support your child for toileting?

at knees

at hips

at shoulders

How does your child indicate toilet needs?

Please briefly explain any toileting "hints" which may be useful for staff.

GENERAL

Is your child comfortable in a wheelchair all day?

How much time does he/she like to spend out of a chair?

Can your child sit alone out of a wheelchair?

tailor sitting

kneel sitting

side sitting

If not, does the child prefer to be

on stomach

on back

on side

Does your child use his/her hands?

Explain his/her hand function.

Which activities needing hand function does he/she particularly enjoy?

How do you carry your child

over shoulder

in arms

over hips

Explain briefly how you lift your child.

D. submitted by:
Ontario Crippled Children's
Centre
Toronto, Ont.

E. Joey

Joey is eleven years old, and lives in Port Credit. Every day he commutes twenty miles to the Ontario Crippled Children's Centre to go to school. Joey has cerebral palsy. He cannot walk or talk. He lives in a wheelchair, and communicates by pointing at symbols on a tray in front of him.

"Good morning, Joey."

Hello.

"Did you see anything exciting last night?"

No.

"Well...what's new?"

Holiday.

"Holiday?"

Yes.

He grins and wriggles in his chair. He is bursting to tell me about it.

"When's the holiday?"

Month O.

"Month O? Uh...I don't get you, Joe. Try to form a sentence with it."

O...O...O...

He pounds three times on the letter, hoping to make me understand.

"Does the month start with an 'O'?"

Yes.

"October?"

An emphatic "Yes".

"So - a holiday in October. Uh, let's see. Oh, I know. Thanksgiving. Do you like turkey as much as I do, eh, Joe?"

H.

He gazes at me hopefully.

"'H'? I don't understand. What does 'H' have to do with Thanksgiving?"

No answer. He just stares at me.

"Do you know the story of Thanksgiving, Joe? About The Pilgrims and Plymouth Rock and all that?"

He puts his head down on his tray, a sure sign of frustration. I am puzzled, not really knowing what I have done wrong. Then it hits me.

Oh, what an idiot I've been. Hollowe'en, of course.

Joey perks up considerably and hollers his agreement, his eyes shining brightly.

"Sure. Hallowe'en. What are you going to be?"

B. Man.

"Yeah, I could have guessed. Hey, you know they took Batman off the air?"

He hollers again and bangs his fist on the tray. He points in the general direction of the bulletin board, and there is a piece of paper. It is a letter of protest to CITY TV from Joey and Terry, another boy in the class. It reads:

Dear CITY TV

We like Batman and Robin very much. We always watch Batman after school. Why Batman not on? We wish it will be on soon.

Joey and Terry
Ontario Crippled Children's Centre.

I turn away from the letter and look at Joey, hunched forward in his chair, spittle running down his chin, his eyes gazing at me hopefully.

"That's beautiful, Joe."

He smiles. Our friendship needs no symbol board to communicate.

E. submitted by:

J.P.D. Blake, 14-year old
student, Upper Canada College,
The College Times - '75

F. Suggestions for Bliss Integration

In offering these suggestions, it is strongly advised that the prospective teacher receive professional training (i.e. workshops) on symbols, and that class size be kept under ten.

1. Ascertain the receptivity of the teacher.
2. Prior to the student's entry, the teacher and school should be well briefed on methodology and the specific student involved (i.e. physical and architectural requirements, medical and educational history). The school nurse, principal and guidance personnel need to be well informed so assistance is practical and supportive to the teacher. An "open line" of communication must be maintained with the feeder school.
3. The class (students) must be prepared for the student's arrival.
4. Integration should be gradual.
5. Convenient transportation must be arranged.
6. The child must be included in regular activities as often as possible.
7. Student volunteers may assist with the child at given times to provide teacher relief.
8. Parent-teacher rapport should be established before the child enters school and then continued.
9. Other staff should be offered brief symbol training in an effort to integrate into all academic areas.

F. submitted by:
Gil Nelson (Principal) and
Sandra Bednarek (Teacher),
Joseph Kaeble Public School,
Base Borden, Ontario.

G.



THE VOICE OF STAFF AND FRIENDS

RIDEAU REGIONAL CENTRE

Smiths Falls, Ontario

Vol. 5 No. 4 December 1974

4 Communication is Bliss

Back at the end of the Institution, quietly nestled between Physiotherapy and the back door, is a little room where a new concept of language development is being taught to residents. We have been working on this program since last February, and now Carol and I are dealing with some forty residents.

The general concept of the BLISS system of language is the use of a symbol to represent an object or a subjective idea. We start out by showing our students a picture of an object and then introduce the symbol drawing of it, later on through learning experiences and repetition we eventually lead to the expression of emotions, questions and other reasoning areas which were previously hard for the handicapped resident to express.

Sometimes the teaching becomes very difficult as some students might not be ready to develop thinking concepts and may therefore have to be kept to the learning of objective symbols for a great length of time. Even if they may only grasp five or ten basic symbols they will still have an aid to communicating with us. Such symbols as mouth, eye, ear, and hand can be taught to most residents easily, eg. the mouth



symbol could mean to talk, to eat, to sing, etc... Later as the students learn more symbols they become more exact in their meanings and by putting two or more together they can develop explanations of words and concepts which they want to express, i.e. boy can be formed by pointing to little and man; even such symbols as television can be broken down to various logical parts...




 television = an object + eye (you see) +

 ear (you hear) + electricity (it is run by electricity)

The residents in our program are all from varying backgrounds, some mentally retarded, some cerebral palsy, some with audio problems, but they all share the need for communication aids.

One of our problems has been the need to get the staff involved in using symbol boards with their residents on ward settings and outings into the community. Only with the co-operation of the ward counsellors, maintenance people, and all of the staff in general will these residents be able to function to their maximum with symbols.



One of our shining lights in the program has been Valerie who though severely athetoid uses a headstick to point out her symbols, and with the help of concerned ward staff she has progressed both on the ward, in social areas and in school where her true potential is now being realized. Now Valerie can fluently converse, make jokes (her favourite symbol is "CRAZY"), and even write stories and poetry. So here is a girl that for eighteen years only people who were very familiar with her and her needs could understand some of what she wanted and now she can make herself understood to anyone who will take the time to look at her board.

There are other students in the program who are making the same headway and I only hope that enough interest will continue to be shown in this means of communication, along with such areas as signing, and speech development so that these programs can really be called successes and fulfill the needs of the facility.

At this time I would like to thank all those who have participated, actively and in the background to make this program work.

Notice a BLISS BOARD TODAY!

Hugh Nelson, MRC
Carol MacLauchlan, MRC

BLISS PROGRAM, RRC.

5

H. VOX Rideau Regional Centre, Smith Falls, Ontario*
The Ontario Games:

THE ONTARIO GAMES
FOR THE HANDICAPPED
5D 21Q #7 + 11 A >1
On May twenty-first, seven of us went to London to compete in the Ontario Games.
There were about 250 athletes from all over Ontario. I was amazed at what the wheelchair athletes and handicapped people did.
I saw a blind person play the piano and sing. He was very good.
blind and deaf people talk to each other with their hands. They put the fingers

*This publication reflects a variety of styles of symbol expression. Therefore we must ask that it not be considered as a model for symbol output, but rather as illustrative of the many different levels of communication possible with Blissymbolics. In accordance with licensing agreements, all symbols are subject to the approval of the Blissymbolics Communication Foundation.

into the other person's hands and talked sign language. I was in the these event. I didn't win a medal but it was fantastic. I met some interesting athletes who were all very happy. The other six teams brought back a lot of prizes. They competed in their wheelchairs and enjoyed themselves very much. I tried to give my friends and I a lot of prizes. I saw a blind person play the piano and sing. He was very good.
blind and deaf people talk to each other with their hands. They put the fingers

I.

CHEDOKE HOSPITALS

"MR. SYMBOLMAN"

a 50 minute movie concerning the Bliss Symbol Communication System created by Charles Bliss and its use with physically handicapped children at the Ontario Crippled Children's Centre.

Should be of interest to all those working with adults and children who have severe communication impairment.

PLACE: NASH LECTURE HALL

TIME: TUESDAY, FEBRUARY 3, 1976, 1200 hours - 1300 hours
1550 hours - 1650 hours

FOR FURTHER

Information: Contact Lynda Archer, Speech Pathologist,
Speech Department, Evel 1, Extension 232, or
Cerebral Palsy Centre 385-5391.

Educating the community is an enormous but necessary task that is a goal of most instructors. This is a copy of a notice sent to parents, local physicians, teachers, speech pathologists and audiologists; bio-medical engineers; physical and occupational therapists; announcing the showing of the movie "Mr. Symbol Man". Education of the public may range from a 5 minute chat in the hall, to a formal presentation, to observation of a program.

I. submitted by:
Lynda Archer
Speech Pathologist
Chedoke Hospital
Hamilton, Ontario

STATEMENT ONE:

"Why not teach him to read instead?" If a child is bright enough to learn symbols, it would be better to devote attention to teaching him words which everyone else uses and thus spare the child the time and effort involved in learning two different systems.

RESPONSE ONE:

This argument is based on the following premises:

1. Words and symbols are organized in the same way;
2. Words and symbols require the same learning abilities;
3. Communication facility utilizing each system can be acquired with an equal amount of effort and time;
4. Words and symbols fulfil the same function.

However:

1. Written words are composed of visual elements (letters and groups of letters) which are related to sound. Blissymbols are composed of visual elements which are related to meaning -- sometimes directly through pictorial representation; sometimes indirectly through representing an idea related to the meaning; sometimes arbitrarily.
2. When the young child first learns words, he must remember an abstract visual configuration; any clue relating this configuration to other parts of the system are based on sound-shape relationships. When the young child first learns Blissymbols he must remember a pictorial representation which refers by its outline directly to the object it portrays.
3. Communication facility utilizing the word system is dependent upon skill in spelling - for which training and practice is required. Facility utilizing the Blissymbol system is dependent upon the ability to select the meaning elements (essential characteristics) required to transmit meaning for which the abilities to classify and describe are required.

4. Both systems do indeed share the common function of providing a vehicle for communication; however the degree of communication comprehensiveness of each system which can be acquired by the young child and the additional functions served by each system are different and should be recognized.

- (a) Words prepare the child for reading and typing (the physically handicapped child's potential written output medium). Words also provide the child with a communication medium which can gradually expand as he masters a growing vocabulary.
- (b) Blissymbols equip the child with a complete communication system (accessible to the bright child within a four to fifteen month period). Blissymbols also provide the child with a medium which facilitates creative thinking, inductive processing and concept clarification. Utilization of the medium involves a conceptual framework which gives the child another perspective in viewing and relating to his world. Blissymbols provide experience in the processing of visual information and thus contribute to learning to read. Incidental experience with words is provided through the child's constant access to the words which appear under each symbol on his display.

In Summary:

Words provide early limited communication which gradually expands; they prepare for reading and typing. Blissymbols provide earlier comprehensive communication and contribute to creativity and cognitive development; they prepare for reading through experience with the process but not directly with the content of the written English system.

STATEMENT TWO:

"Words can do as much as symbols can do". If a child has 100 spaces which can be clearly indicated by him, he will be able to communicate as fully with 100 words in the spaces as he would do with 100 symbols occupying the spaces.

RESPONSE TWO:

This statement fails to recognize the communication potential arising from the structure of the Blissymbol System. Each symbol, whether it be a simple or compound symbol, represents a concept which can encompass a range of meanings and be translated by many words. For example, the symbol for "building" can be interpreted as house, home, structure, hotel, garage, shack, palace, office, tent, etc., through utilizing information from the situational context or by responding to additional symbol clues.

Secondly, each symbol element can be combined and recombined with other elements to form new concepts.

One hundred symbols can lead to an infinite number of words - as many as the child's creative ability will allow. Only through the ability to spell could the word system provide the same communication potential. It can be argued that a broad meaning can also be taken from individual words and that symbols are not necessary. This can certainly be done by those skilled in communicating with the children but it involves mis-using a system which is based upon precision and accuracy of word meaning. One feels that the child is using a rudimentary form of the word system (e.g. pidgin English); whereas with symbols, the child is creatively using a device which is an integral part of the system. The child is indicating a mastery of the symbol system which gains him recognition rather than utilizing an inferior form of the word system which tends to minimize his capabilities as perceived by others.

STATEMENT THREE:

"Symbols emphasize that the child is different and present a negative image to others".

RESPONSE THREE:

Our experience has been just the opposite. When open-minded newcomers meet symbol-using children for the first time, they are intrigued by the uniqueness of the children's communication mode.

They are impressed with the children's ability to relate to others and to communicate unanticipated information. As they become aware of the children's ability to create new symbols and the manner in which the symbol output is integrated with gesture, early alphabet skills and vocalization, most persons become highly motivated to interact with the children and to learn enough about the symbols to communicate at a level which utilizes the many strategies inherent in the structure of the system.

STATEMENT FOUR:

"Symbols restrict the number of persons with whom the children can communicate, for one must know the symbol system before one can understand the children's output."

RESPONSE FOUR:

Not true! One does not have to learn the symbol system in order to communicate with a symbol-using child. A WORD APPEARS UNDER EVERY SYMBOL on the child's display. Those persons who do not have the time or the desire to learn the symbols can communicate at the word level with every symbol-using child. Basic communication is possible with everyone.

STATEMENT FIVE:

"Blissymbols are best suited to serve as a communication medium for the mentally retarded child. The bright child should learn words." OR CONVERSELY "Blissymbols are too difficult for the mentally retarded child; only the child with average or above average intellectual ability should be introduced to the symbols."

RESPONSE FIVE:

There is need for exploration of symbol use by children at differing intellectual levels. The child's intellectual ability will determine the use he makes of the symbols. The child with limited mental ability will require a teaching approach suited to his needs and will limit his communication to basic needs and immediate situations. The brighter child can become involved with the organization and strategies of the system and can

become proficient at communicating at various levels, dependent upon the symbol expertise of the person with whom he is communicating. Inherent in the Blissymbol system is a complex, comprehensive, creative communication potential, (the details of which are outlined in C.K. Bliss' text Semantography - Blissymbolics, Semantography-Blissymbolics Publications, which can serve the symbol-user into adulthood, should he wish to continue an involvement with the system!

STATEMENT SIX:

"Blissymbols are only useful as a bridge to reading."

RESPONSE SIX:

Blissymbols do provide an excellent preparation for learning to read (see Response number 1). They are however, components of an independent communication medium and deserve recognition in this capacity. The symbol system, Blissymbolics, contains an organization and structure which makes it a valuable communication medium with potential application to a wide range of children and adults with communication difficulties.

Appendix 10 submitted by:
Shirley McNaughton
Blissymbolics Communication
Foundation
Toronto, Ont.

APPENDIX 11

EYE POINTING

pages 418 - 448

A. Eye Pointing: An Alternate Mode of Response

Blissymbolics has opened the world of communication for the first time for many non-verbal physically handicapped individuals. Across many nations non-verbal physically handicapped individuals are now experiencing the power of communication and are able to be active participants in their learning and social environments.

Use of Blissymbolics as a creative, spontaneous language requires not only the ability to learn the symbol meanings receptively but also the expressive ability to indicate symbol choice. In our symbol communication program at Como School in St. Paul, Minnesota, our children are using three modes of indicating symbol choice. These modes are: isolated finger pointing, activating a switch on an electronic device and eye pointing.

The purpose of this paper is to describe the equipment and training procedures we use in developing an eye pointing mode of response.

Before dealing with equipment and training procedures, it is necessary to discuss the criteria used for selecting eye pointing as a mode of response for a given individual. Because of the severity of physical involvement, many of our children are not able to use an isolated finger point that is accurate and reliable within a reasonable length of time. Therefore, choice of mode of response has been between eye pointing and activating a switch on an electronic device. We have had very little opportunity to experiment with electronic devices because of their cost and limited availability. However, in using the devices we have, and in considering use of others we have seen, we have concerns about their lack of mobility and the length of time required to indicate symbol choice.

We have, therefore, selected eye pointing as the most efficient mode of response for most of our children who are unable to use an isolated finger point. Through using eye pointing as their expressive mode of response, our most severely involved children are able to give rapid, accurate and reliable indications of symbol choice.

The following sections on equipment, positioning and procedure detail a method we have found trains the student in eye pointing logically and efficiently. This method has been practiced since October, 1975 and is still being improved as more experience is gained.

B. Positioning and Equipment

The key to successful instruction in eye pointing and at later stages, to rapid, accurate communication, is precise position of the student and attention to the smallest detail in equipment location. We have found the normal upright position, with a lap board to be the most successful. Depending on the student, it may be necessary to use any or all of the following to provide stability and security in the wheelchair:

1. Foot pedals with heel and toe cuffs;
2. Chair inserts;
3. Body harness (Adaptive Therapeutics) with shock cords;
4. Leg straps;
5. Head halter;
6. Back and seat rests (to break extension patterns).

Presently, we are using the lap board shown in Figure 1.

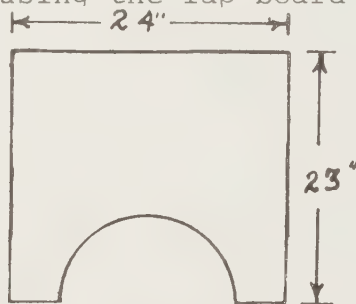


FIGURE 1

The cutout in this design provides better stability for the arms and greater student comfort. With some students, especially athetoids, building up the lap tray with 3 inch blocks provides better arm stability. The lap board size allows ultimately for a 400 symbol board to be used and easily seen by the student.

Symbol boards used for eye pointing instruction should be placed on the lap board, away from the student's body to ensure good visibility of the bottom symbol rows (as viewed by the student). See Figure 2.

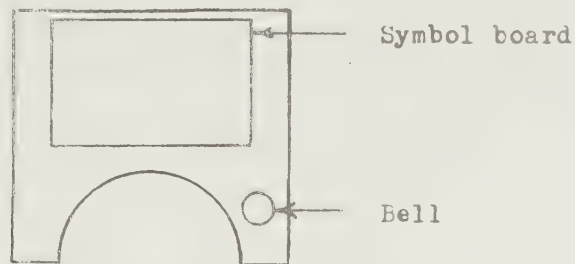


FIGURE 2

We find it better to either cover lap boards with plexiglass or laminate symbol boards prior to taping to the lap board. In this way the symbols are available at all times including during meals, and are protected.

Also, a part of our lap board equipment is an alerting device, currently a metal desk top bell, which allows our eye-pointers to alert someone that they have something to communicate. Through the use of the bell, our students now have the opportunity both to initiate conversations and to compete in answering in group situations.

Placement of the bell varies with each child's physical abilities. Most of our bells are placed on the arm rest portion of the lap board so that the child can use an elbow or forearm movement to ring the bell (Figure 2). The best side and precise location on the arm rest for the bell is decided during training sessions with the therapist.

C. Training Procedure

1. LEVEL I

GOAL:

Establish two gross eye pointing positions (left and right of the horizontal midline) which allow the child to make a reliable indication of choice.

MATERIALS:

Common objects, pictures and symbol cards (approximately 2 inches x 2 inches).

PROCEDURE:

1. Place the two common objects on the lap board as shown in Figure 3 and direct the child's attention to each object in turn.

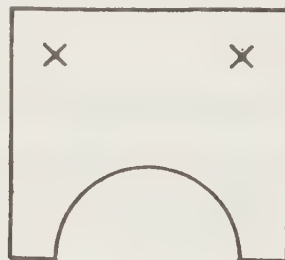


FIGURE 3

2. Request the child to establish eye contact with the instructor (head in midline).

3. Give the child a carrier phrase such as "Look at the shoe".

4. When the child looks at either object, the instructor immediately confirms the child's choice with "You are looking at ____" (one of two objects).

5. The correct response is for the child to look quietly and directly from midline position to correct object on right or left.

This procedure should be used in training response pattern for correctly locating objects, then pictures and finally symbols.

2. LEVEL II

GOAL:

Establish colour associations (red and green) with the two Level I response positions (horizontal plane).

MATERIALS:

Red and green objects and pictures. Two index cards or 2 inches x 2 inches cards, one with a green and one with a red solid circle 1 inch diameter.

Tape index card with red circle in the upper left corner of the lap board and the green in the upper right corner of the lap board.

PROCEDURE:

1. Direct the child's attention to the colour cards placed in the established response positions.

2. Introduce a red or green object in the midline and direct the child's attention to the object.

3. Describe the object in terms of colour (red or green) and demonstrate matching of the object to the colour circle by moving the object from midline to the appropriate colour side. Example: "The red apple goes with the red circle."

Continue this step until you have demonstrated matching of approximately 10 to 15 red and green objects or pictures.

4. Introduce a red or green object in midline and use a carrier phrase such as "Look at the colour dot that goes with this red (or green) _____" (Name object).

5. When the child has eye pointed, the instructor should immediately confirm the child's choice as correct or incorrect with "You are looking at _____" (Name colour).

6. Correct response is for child to look directly from the object in midline to the appropriate solid colour circle.

Note: It may be necessary to return to this level in training for colour matching as new pairs of colours are introduced.

3. LEVEL III

GOAL:

Transfer the two colour coded eye pointing responses from the horizontal to the vertical plane.

MATERIALS:

Plexiglass sheet 18 inches x 14 inches with two colour coded circles (one inch diameter solid) in upper right and left corners, a small black dot (1/8 inch) placed in the centre of the sheet. See Figure 4.

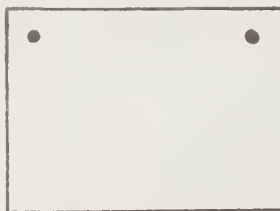


FIGURE 4

Vertical Plexiglass Sheet
as viewed by student

Red and green index cards, objects and pictures as for Level II and symbol cards as for Level I. Tape index card with red circle in the left corner of the lap board and the green circle in the right corner of the lap board.

PROCEDURE:

1. Place two objects, pictures or symbols in right and left positions below the colour coded cards.

2. Direct the child's attention to both the object and the associated colour. Examples: "The shoe goes with the red dot."
"The sock goes with the green dot."

3. Introduce the plexiglass sheet. The sheet should be held vertically between the child and instructor (Figure 4). The sheet should always be in the same position and steady. The instructor should be seated in a chair which allows him/her to be at eye level with the child. The black dot in the centre of the plexiglass helps to line up eyes to eyes. The red dot should always be in the upper right corner for the instructor.

This position has been achieved for most of our children by resting the plexiglass sheet on the outside rim of the lap board with the instructor holding the sheet approximately four inches up.

4. Direct the child's attention (instructor pointing) first to each dot on the lap board and then to its associated dot on the plexiglass. Example: "Look at the red dot on your board. It goes with the red dot up here."

5. Direct the child's attention (instructor pointing) to the association between the dot colour on the plexiglass and the object of the same colour placed below on the lap board. Example: "The shoe goes with the red dot here (pointing on the lap board) and the red dot here (pointing on the plexiglass sheet)." This step should be repeated until 20 objects have been demonstrated.

6. Place two items (objects, pictures, or symbols) under the colour positions on lap board and direct the child's attention to each in turn.

7. Request the child to establish eye contact with the instructor (head in midline).

8. Use a carrier phrase, such as "Look at the _____ (one of the items) and the colour that goes with it. Then look at that colour up here." This instruction may have to be given several times as the child locates the item, locates the associated colour on the lap board and eye points to that colour on the plexiglass sheet.

9. When the child has eye pointed to either the red or green circle on the plexiglass sheet, the instructor should immediately give confirmation of the child's choice. Example: "You are looking at red, that means you are telling me shoe."

10. Correct response is for the child independently to locate object and colour on lap board and eye point to that colour on the plexiglass.

Note: Moving from objects to pictures to symbols, this level allows introduction of early pairs of symbols around which language learning and communication experiences can be structured.

Examples:


food


drink


mother


father


boy


girl

At this level, symbol positions should be interchanged to verify that the child is learning symbols and not just position or colour.

4. LEVEL IV

GOAL:

Establish 10 colour coded eye pointing positions on the plexiglass sheet (vertical plane).

MATERIALS:

Plexiglass sheet, 18 inches x 14 inches.

Ten colour pens (Sharpie, Papermate, Flair)

1 red

2 yellow

3 green

4 orange

5 dark blue

6 pink (not available in Sharpie)

7 brown

8 light blue (not available in Sharpie)

9 purple

10 black - used to outline border for 1 inch diameter

Colour #10 is no colour referred to in training as "nothing colour".

Assorted colour pictures.

Ten index cards with solid one inch diameter circles.

Figure 5 shows colour placement as viewed by the child. Note: Red always appears in the upper right corner for the instructor.

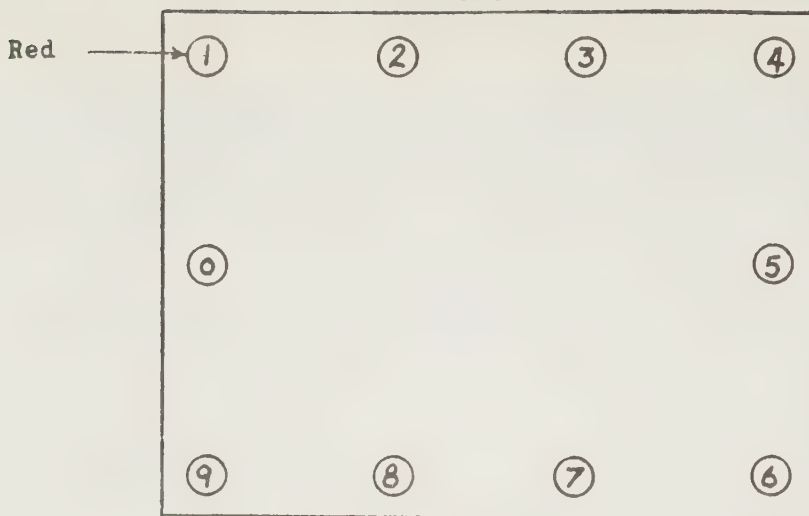


FIGURE 5

PROCEDURE:

1. Draw on the plexiglass sheet the colour circles (1 inch diameter outline in black) numbered ① and ④ in Figure 5.

2. Introduce and place one colour ① or ④ item on the middle of the child's lap board.

3. Direct the child to establish eye contact with the instructor and verbally give a carrier phrase, such as "Look at the colour of the apple. Find that colour up here" (pointing to the plexiglass).

4. When the child has eye pointed to a colour, the instructor should confirm the choice made. Example: "You are looking at red. That means you are telling me the colour of the apple is red."

5. Correct response is for the child to first look at the object on the lap board (horizontal plane) and then look directly at the appropriate colour circle on the plexiglass (vertical plane).

Note: The task here is colour matching, not colour naming.

6. Add to the plexiglass coloured circles (6) and (9).

7. Place a single item of colour (1), (4), (6) or (9) in the middle of the lap board and proceed as in steps 3 4 and 5 above.

8. Continue adding two colours at a time to the plexiglass in the following order, (2) and (8), (3) and (7), and finally (5) and (10).

Use training procedures in steps 2, 3, 4 and 5 until the child establishes 10 reliable eye pointing positions on the plexiglass sheet.

5. LEVEL V

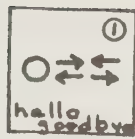
GOAL:

Develop a 10 symbol one colour code eye pointing communication board.

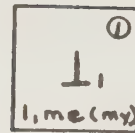
MATERIALS:

Plexiglass sheet with 10 colours (Figure 5).

Two sets of ten 2 inches x 2 inches symbol cards: one set with a 1/8 inch colour dot in the upper right corner of the card. Symbols used for the two sets are those learned in previous levels. The colour dots placed on this set are the second colour in the two colour code for symbol location on the 100 symbol board. See discussion for colour coding in Materials section of Level VIII. Recommended symbols are:



or



and/or



or



or



Symbols have been selected to allow the instructor to plan language activities and experiences around vocabulary (eating, people in the environment, home and school, needs and play). Symbols should be taped on the child's lap board in the same order (by colour dot) as they appear on the plexiglass sheet. See Figure 6.

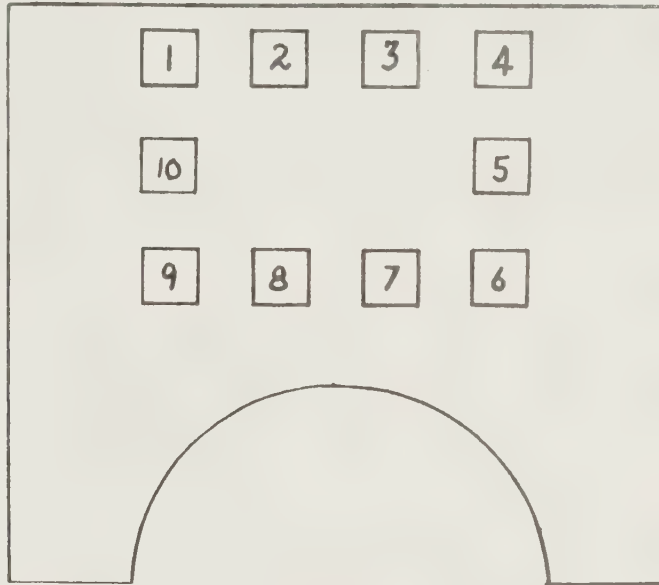


FIGURE 6

PROCEDURE:

1. Introduce 10 symbol board to the child as one unit.
2. Describe and point out location pattern (relationship between symbol and its colour code) on communication board. Example: "The colour pink goes with mother."
3. Describe and point out response pattern for colour coded symbol on the plexiglass sheet. Example: "To tell me 'mother', you look at pink up here."
4. Demonstrate (instructor pointing) location pattern (horizontal plane) and response pattern on the sheet (vertical plane) for all 10 symbols. Example: "To tell me about 'mother', you first look

for the 'mother' symbol on your board and its colour - pink; then look right at pink up here."

5. Introduce matching symbol cards (second set of 2 inches x 2 inches cards without colour dots) one at a time (and later objects, people, pictures, verbal directions). Using a carrier phrase such as "Find this symbol and its colour on your symbol board, and then look at its colour up here."

6. The instructor should give immediate verbal feedback when the child has eye pointed to his colour choice. Example: "you are looking at pink. That means you are telling me 'mother'."

7. Correct response is for the child independently to view stimulus (symbol matching card, then later objects, people, pictures and verbal directions) locate symbol and its associated colour on his communication board (horizontal plane) and then to eye point directly to the correct colour on the plexiglass sheet (vertical plane).

Note: Training activities at this level require some time on rote drill. Consideration should be given to using varied language activities so that the child does not become bored. At this point the child does not yet understand or have the ability to initiate communications. However, we have found it is important to continue to set training activities up so that the child has opportunities to make choices.

6. LEVEL VI

GOAL:

Develop a 10 symbol, two colour coded, eye pointing communication board.

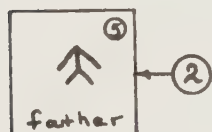
MATERIALS:

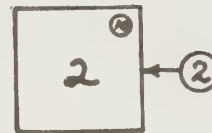
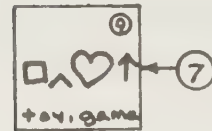
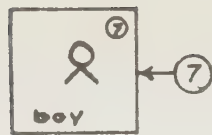
Plexiglass sheet with ten colours.

Teaching materials from Level V.

Two sets of 10 2 inch x 2 inch symbol cards (same as in Level V).

Add the second colour (referred to in training as 'line colour') to the 10 symbol cards on the communication board. The second colour is added by drawing a border (about 1/8 inch) around the outside rim of the 2 inch x 2 inch card. The border colour codes (as on the 100 symbol board) for the 10 symbols are:





'Line colour' on the 100 symbol board is the first colour given in the two colour code. Generally, 'line colour' indicates a class of symbols (example: most people symbols have 'line colour' yellow; body parts have 'line colour' dark blue). The procedure used for training the two colour code on the 10 symbol board is the same as used on the 100 symbol board. The code is described as 'line colour then dot colour'.

PROCEDURE:

1. Introduce 10 symbol, two colour coded board to the child as one unit.
2. Describe and point out location pattern (relationship between symbol and its two colour code) on the symbol board. Example: "The colours for 'mother' are: 'line colour' yellow (point to border colour) and 'dot colour' pink (point to dot)." Restate code, "Yellow and then pink".
3. Describe and point out the response pattern for two colour

coded symbol on the plexiglass sheet. Example: "To tell me 'mother' you look at yellow and then pink up here" (pointing to plexiglass).

4. Demonstrate (instructor pointing) location pattern (horizontal plane) and response pattern on the plexiglass sheet (vertical plane) for all 10 symbols. Example: "To tell me about 'mother', you first look for the 'mother' symbol on your board and get 'mother's' line colour-yellow and dot colour-pink; then look at yellow and then pink up here." Note: Demonstrate eye movement from yellow to pink without re-establishing eye contact with the child.

5. Introduce matching symbol cards (second set without colour code) (later use objects, people, pictures, verbal directions) one at a time using a carrier phrase such as: "Find this symbol and its colour code on your symbol board and then look at its line colour and dot colour up here."

Note: It is important to train the child at this point to give the two colour eye pointing code smoothly without re-establishing eye contact until both parts of the code have been given. When the two colour code is a double colour code (e.g.  brown-brown) train the child to look at brown then the black dot (1/8 inch diameter) in the centre of the board, careful not to establish eye contact with the listener, and then directly back to brown until the whole code is given.

6. As the child eye points to the line and dot colours on the plexiglass sheet, the instructor gives verbal confirmation of the child's code by saying the colours as the child eye points to each colour in the code. For example, "yellow" after the child eye points

to yellow, then "pink" after the child eye points to pink. Careful attention should be given to seeing that the child does not re-establish eye contact with the instructor until both colours in the code have been given. After the instructor has verbally confirmed the two colour choice, he should then show the child (verbally and pointing to the symbol and colour code on the symbol board) the relationship between the colour code and its related symbol. For example: "you told me line colour yellow (pointing to board) and dot colour pink. Yellow - pink tells me you want the symbol 'mother' (pointing to the symbol)".

7. Correct response is for the child independently to view the stimulus (symbol, object, people, picture or verbal directions), locate the symbol and its associated line and dot colour on his communication board (horizontal plane) and then eye point directly to line colour-dot colour on the plexiglass sheet (vertical plane).

7. LEVEL VII

GOAL:

Establish "yes" and "no" response positions on communication board.

MATERIALS:

Two 2 inches x 2 inches cards with +!! yes and -!! no.

Materials for 10 symbol board.

PROCEDURE:

1. Introduce "yes" and "no" symbol cards (symbols learned in previous levels) and tape them on the lap board next to the symbol board, "no" on upper left hand corner, "yes" on upper right hand corner.

2. Train child to indicate "yes" by an eye point on communication

board. Eye point to left (looking at symbol) for "no" and to right (looking at symbol) for "yes". Note: This response pattern for "yes" and "no" is used on the 100, 200 and 400 symbol boards. We have found "yes" and "no" to be a difficult concept for some students when used in question form as in "Is this an apple?"

3. When the child eye points to "yes" or "no" the instructor should give immediate verbal confirmation of the child's choice.

4. Correct response is for the child independently to use eye pointing (on horizontal plane) to left for "no" and to right for "yes".

8. LEVEL VIII

GOAL:

Transfer use of two colour coded eye pointing response to 100 symbol board.

MATERIALS:

Plexiglass sheet with 10 colours.

100 symbol colour coded board.

Two 2 inches x 2 inches symbol cards with "yes" and "no" symbols.

INSTRUCTIONS ON COLOUR CODING 100 SYMBOL BOARD:

Materials needed are 10 colour pens and a B.C.F. 100 symbol board. We have made the following changes or additions in symbols on the B.C.F. 100 symbol board:

"bus" and "swim" in bottom two squares in line under 0.

"boy" and "girl" replacing "word" and "light" in line under #7.

"therapist" replacing "God" in line under #8.

"delete" replacing "flower" in line under #9.

The line colour will be the first colour used in giving code response. As mentioned previously, line colour generally marks a certain class of symbols (for example, all body parts have the line colour dark blue). Line colour is drawn on as a border (approximately 1/16 inch) around

the outside rim of each symbol in that line from top to bottom of the symbol board. The colour order for drawing on line colour is:

Number across top
of 100 symbol board

Line Colour

0	-----No colour (no line colour added)
1	-----Red
2	-----Yellow
3	-----Green
4	-----Orange
5	-----Dark blue
6	-----Pink
7	-----Brown
8	-----Light blue
9	-----Purple

The dot colour will be the second colour used in giving coded response. Dot colour is drawn on as a small dot (approximately 1/8 inch diameter) in the upper right hand corner of the 1 inch symbol squares moving from left to right across each symbol row.

The colour order for dots is:

Symbol in left
hand line

Dot Colour

0	-----No colour
Hello-goodbye	-----Red
Please	-----Yellow
Thanks	-----Green
I'm sorry	-----Orange
Opposite	-----Dark blue

Many -----Pink
 Music -----Brown
 Bus -----Light blue
 Swim -----Purple

PROCEDURE:

1. Introduce 100 symbol colour coded board as one unit to the child. Tape the 100 symbol board on the lap board. Tape "yes" symbol card on lap board near upper right hand corner of symbol board and "no" symbol card near upper left hand corner of symbol board. See Figure 7.

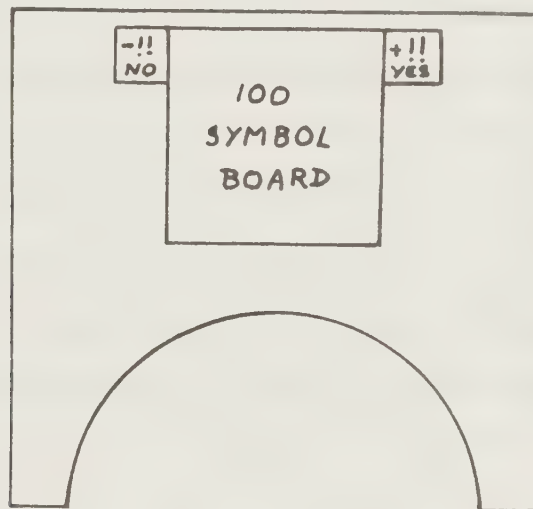


FIGURE 7

2. Using steps in the training procedure for Level VI train the child to locate and give correct eye pointing response for the 10 symbols they know.

3. Expand symbol vocabulary using same training procedure (Level VI) as new symbols are introduced in language learning and communication situations.

4. Instructor should give verbal recognition of colour code (naming the colours) and the location of the associated symbol on the symbol board in the same manner as described in step 6 of Level VI.

5. As the child begins to use a series of symbols in a message, he should be trained to re-establish eye contact with the instructor after the two colour code for each symbol in the message. This eye contact signals the end of the code and a chance for the listener to find the symbol. Instructor should verbally say *each* word after child gives two colour code. Example: "yellow-pink"; "mother".

6. Correct response is for the child independently to locate symbol desired and its associated colour code (line and dot) on his language board (horizontal plane) and then eye point to correct code (line and dot colours) on plexiglass sheet. Note: We have found that our children quickly learn to memorize the colour codes for "favorite" symbols. It is important to continue to stress the importance of checking symbol location and colours on their board so that the pattern of horizontal plane location followed by vertical plane response is well established.

9. LEVEL IX

GOAL:

Establish 10 number coded, eye pointing positions on a plexiglass sheet (vertical plane).

MATERIALS:

Plexiglass sheet, 18 inches x 14 inches.

One black magic marker.

10 index cards with numbers 0 through 9.

Diagram of number placement as viewed by the child (number one is

always in the upper right hand corner as viewed by the instructor holding plexiglass sheet up to child). See Figure 8.

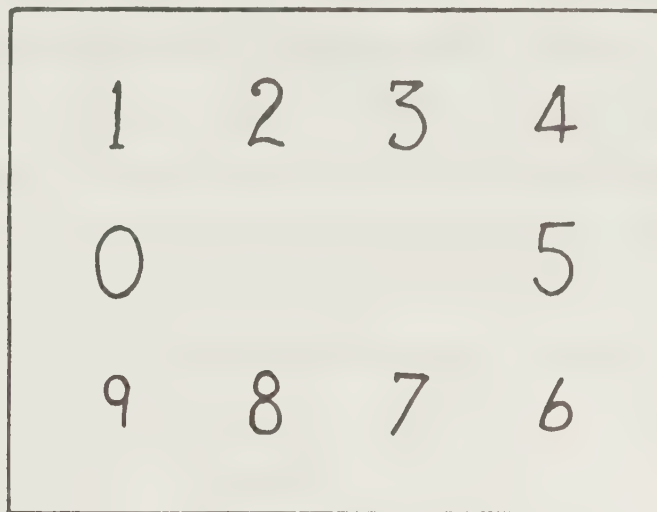


FIGURE 8

The numbers are 2 inches high and 1 inches wide. They should be placed $\frac{3}{4}$ to 1 inch in from the edge of the sheet. The distance between the numbers should be approximately 4 inches.

PROCEDURE:

Training procedures used to establish ten number coded, eye pointing positions for use with the 200 and 400 symbol boards should follow the same basic steps as used to establish 10 colour eye pointing positions in Level IV.

1. Draw on the plexiglass numbers 1 and 4.
2. Introduce and place one number 1 or 4 card on the middle of child's lap board.
3. Direct child to establish eye contact with instructor and use a carrier phrase such as "Look at the number on your lap board

and find that number up here.

4. When child has eye pointed to a number on the plexiglass sheet, instructor should give immediate verbal confirmation of the child's response choice. For example: "You are looking at number 1."

5. Correct response is for the child to first look at the number on the lap board (horizontal plane) and then look directly at the appropriate number on the plexiglass sheet (vertical plane).

6. Continue adding two numbers at a time to the plexiglass sheet in the following order: numbers 6 and 9

numbers 2 and 8

numbers 3 and 7

numbers 5 and 0

Use training procedures in steps 2, 3, 4, and 5 to establish 10 reliable eye pointing positions on the plexiglass sheet.

10. LEVEL X

GOAL:

Train the child to retain and eye point to sequences of two or three numbers.

MATERIALS:

252 index cards numbered 1 to 252.

PROCEDURE:

In training number sequencing it is not necessary for the child to comprehend number meaning (example: two hundred and four) as the task is only number matching. In this level our children have initially only been learning to remember sequences of up to three single numbers (example: 2-0-4).

1. Place a two number sequence index card on the middle of the lap board (single number learned in Level IX). Describe and point out

the left to right number sequence as two single numbers. Example: Using an index card with "24" on it. "Look at this number. It is 2 and then 4."

2. Describe and point out the response pattern for the two number code on the plexiglass sheet. Example: "To tell me 2-4 up here, you first look at the 2 and then go right to the 4." Point out to the child that he is not to re-establish eye contact with the instructor until he has looked to both numbers.

3. Direct the child to establish eye contact with instructor and use a carrier phrase such as "Look at the numbers on your lap board and find those numbers up here."

4. As the child eye points to number code, the instructor gives verbal confirmation of numbers in the sequence (1, 2, or 3) by quietly naming the number(s). Example: "Two-four". After the child has completed eye pointing to number sequence, the instructor should then show the child (verbally and by pointing to the number on the lap board) the relationship between the number sequence on the lap board and the number sequence on the plexiglass sheet. Example: "You told me 2 and then 4 up here. That is the 2-4 you have on your lap board."

5. Steps one through four should be used to train number sequences up to three.

Note: This level requires rote drill and can become very boring for the child and the instructor. We have found it is best to begin training on Levels IX and X well before the child is ready to transfer to a 200 symbol board. A smooth transition to number coding and the 200 symbol board can be accomplished by spending short periods of time training for number coding during the time the child is using the 100 symbol board and colour coding for communication.

11. LEVEL XI

GOAL:

Transfer use of number coded eye pointing response to 200 symbol board and/or 400 symbol board.

MATERIALS:

Plexiglass sheet with 10 numbers.

200 symbol number coded board, or 400 symbol number coded board.

Ball point pen - blue or colour other than black.

INSTRUCTIONS ON NUMBER CODING 200 or 400 SYMBOL BOARDS:

Symbol boards are numbered consecutively from 1 on the symbol square in the upper left hand corner of the board to the last number on the symbol square in the lower right hand corner of the board. See Figure 9, example of 200 symbol board.

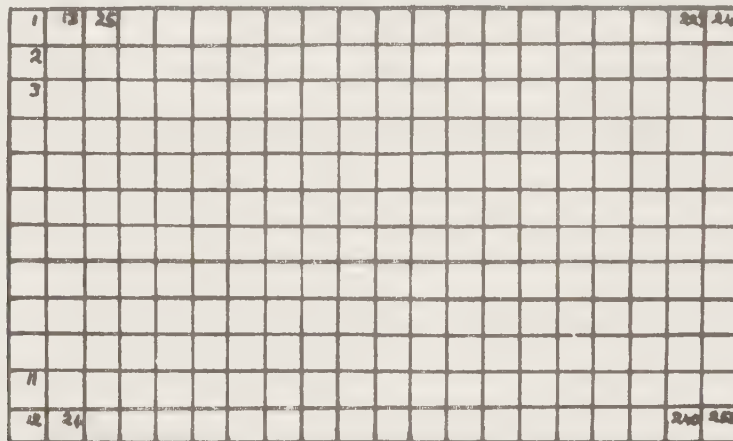


FIGURE 9

The number sequence for each symbol is placed in the upper right hand corner of the symbol square. Numbers should be approximately 1/8 inch high and should be written in blue or some colour that helps visually distinguish the number code from the symbol.

This design for numbering the 200 and 400 symbol boards has been used for two reasons; first, so that groups of numbers can correspond

to types of symbols (example: 27 through 48 are people; symbols 136 through 145 are body parts; 232 through 239 are time symbols) and secondly, for 'listener' ease in location of symbol. We have typed up numbered lists with the word (word under the symbol) next to each number to aid a listener in rapid decoding.

PROCEDURE:

1. Introduce 200 (400) symbol board as one unit. Point out location on the board of known symbols from the 100 symbol board.
 2. Describe and point out location pattern (relationship of symbol to its 1, 2, or 3 number code) on the symbol board. Example: "The numbers for 'mother' are 4-3."
 3. Describe and point out the response pattern for the number coded symbol on the plexiglass sheet. Example: "To tell me 'mother' you look at 4 and then go directly to 3."
 4. Demonstrate (instructor pointing) location pattern (horizontal plane) and response pattern on the plexiglass sheet (vertical plane) for symbols from 100 symbol board. Example: "To tell me about 'mother' you first look for the 'mother' symbol on your board and get 'mother's' numbers 4-3; then look at 4 and then 3 up here."
- Be sure to demonstrate eye movement from 4 to 3 without re-establishing eye contact with the child.
5. Ask the child to find symbols learned on the 100 symbol board by using index cards with symbols on them, (objects, pictures or verbal directions). Use a carrier phrase such as: "Find this symbol and its number on your symbol board and look at its numbers up here."

Note: When the number code is a double or triple combination of the same number (example: happy is 9-9) train the child to look

at 9, then to the black dot in the centre of the board and then directly back to 9 without re-establishing eye contact with the instructor.

6. As the child eye points to number sequence, the instructor gives verbal confirmation of the child's code by saying the numbers aloud. The child should be trained to re-establish eye contact with the instructor to signal the end of the code sequence (one to three numbers).

7. When the child has re-established eye contact, the instructor should show the child the relationship between the number code and its related symbol. For example: "You told me 4-3. 4-3 tells me you want the symbol 'mother' (pointing to symbol)".

8. Correct response is for the child independently to view or hear a stimulus, locate symbol and its associated number code on his communication board (horizontal plane) and then eye point directly to the numbers on the plexiglass sheet (vertical plane). Verbal feedback which the instructor should give to the child after each symbol is "4-3; mother".

9. Expand symbol vocabulary by repeating steps 2 through 8 when new symbols are introduced in language learning and communication situations.

10. As the child begins to use a series of symbols in a message he should be reminded to re-establish eye contact with the instructor after the number sequence is given for each symbol in his message so that the listener has time to decode.

CONCLUSION

The procedure detailed above if followed, allows some severely involved, non-verbal, physically handicapped individuals the opportunity to achieve rapid and accurate communication. Careful consideration should be given to the individual's physical abilities when selecting the most appropriate response mode. We at Como, are working with a limited population of non-verbal physically handicapped students within which we have found eye pointing to be the most successful response mode for those students who could not use isolated finger pointing.

The eleven levels discussed are designed to train each individual student to a level of reliable, rapid and accurate communication with anyone. We find that, as eye pointing progresses the confidence and general attitude of the student improves, thus assisting in all phases of the students' life.

Presently, this eye pointing technique is being refined as more students with differing abilities are included in our program.

ACKNOWLEDGEMENT

The author wishes to acknowledge the assistance of the interdisciplinary team at Como Elementary School and especially Mary Jo Coleman, OTR, in developing and refining the use of eye pointing as a response mode.

submitted by:
Pat Conner
Como Elementary School
St. Paul, Minn.

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I RESEARCH GOALS

page one

The general purpose of the Evaluation Study was:

to conduct a formative evaluation of the symbol system by collecting information from instructors in a variety of settings regarding the effectiveness of the symbol system based on their records of symbol performance, their experience with various teaching procedures and their reactions to the Ontario Crippled Children's Centre symbol vocabularies.

The objectives of the study were to obtain information about factors which influence the effectiveness of symbol communication and to document the effects of symbol communication.

Attention was focused on:

- (1) The communication, academic, social and psychological development of the symbol user;
- (2) The interrelationship of symbol usage with the family, instructor and setting;
- (3) The instructor's evaluation of current symbol displays and teaching programs.

II POPULATION

pages 2 - 12

A. The Study Population

The population for the study was composed of children who had been identified as being orthopedically handicapped and lacking in functional communication ability. These children were identified through a District Nurses Survey conducted by the Ontario Crippled Children's Centre (O.C.C.C.), by teachers who attended communication workshops at O.C.C.C., and through direct correspondence with a variety of treatment centres in Canada and in the U.S.A. Generally, the group of children so identified consisted of young physically handicapped, primarily cerebral palsied, children in whom disturbances of the respiratory, phonatory and articulatory systems were so severe as to prevent or markedly retard the development of functional speech.

B. Cerebral Palsy

Cerebral palsy is a term that has been applied to many different conditions whose primary characteristic is a motor disorder or difficulty in body movements or control. It is a descriptive term rather than an etiological diagnosis and refers to motor dysfunction resulting from an injury to the brain during the developmental period (before age 18). The American Academy of Cerebral Palsy proposes seven different types of manifestations of the motor disorder: (1) rigidity, which is characterized by a stiffness of the body and limbs; (2) spasticity, which results in the muscles becoming stiff with increased movement; (3) tremor, in which the limb quivers when a voluntary and co-ordinated movement is attempted; (4) ataxia, which is usually shown by a staggering gait or jerky arm movements; (5) athetosis, which is characterized by a

"writhing" or overflow of muscle movements that makes the whole body move when the person attempts to move only one part; (6) atonia, which is demonstrated by lack of sufficient muscle tone; and (7) mixed, a term used when an individual displays more than one of the above characteristics.

The causes of such a diverse symptomatology are also many and diverse. They include genetic conditions that produce inborn errors of metabolism which in turn cause brain damage and motor dysfunction; prenatal viral and bacterial infections; trauma at the time of birth that may produce anoxia; and postnatal infections such as pneumococcus, meningitis or measles encephalitis. The number of cerebral palsied persons has been estimated at 50,000 in Canada and 550,000 in the U.S.A.

The same insult to the central nervous system that causes motor dysfunction also causes other handicaps such as mental retardation (50%), hearing loss (25%) and vision defects (50%). With regard to speech disorders, references in the literature indicate a high percentage of speech difficulties among the cerebral palsied population e.g. 60% (Illingworth, 1958); 70% (Cruikshank and Raus, 1955); 67.9% (Keats, 1965). Such reports do not indicate the proportion of speech defects which are so severe as to prohibit communication. A very modest estimate has been made that 8.7% of the cerebral palsied population are without functional speech (Kates, McNaughton, 1975). This statistic was obtained without consideration of institutionalized persons, however, and can be considered only as a minimum estimate.

C. Sample Selection

Of forty-four settings servicing physically handicapped non-speaking children which had been invited to participate in the study, thirty-five agreed. These thirty-five settings contained one hundred and sixty-nine children.

Upon careful examination of these settings a number of important factors became apparent which influenced the nature of the design utilized in the study. These factors were:

1. The widespread use of Blissymbols in a number of settings;
2. The heterogeneity of the children within and between settings;
3. The unique characteristics of each setting;
4. The wide variability in numbers of children from setting to setting.

Given these characteristics and the fact that the study was to be a formative evaluation of the Blissymbol system, it was decided to utilize the entire population of one hundred and sixty-nine children. The performance results were examined along the dimensions of intelligence rating, age, disability and experience with symbols. Information was obtained for each dependent variable at the beginning of the study and again at later points in the programs; in this way, each symbol-user served as his own control. The research population (actual participants) at the commencement of the study (December 1974) consisted of one hundred and fifty-seven persons in thirty-two settings.

1. GENERAL DESCRIPTION OF SAMPLE (used in the analysis)

- (a) Sex: Males composed 56% (88) of the sample while 44% (69) were female. (Appendix 4a, Table 1).
- (b) Residence: Approximately one third (31%) of the sample resided in an institutional setting while the remaining 69% (108) lived at home with their parents, in foster homes or in adoptive care. (Appendix 4a, Table 2).
- (c) Age: While the sample was originally arbitrarily divided in ten age levels ranging from birth to over thirty, the majority of the sample (78%) ranged in age from six to fifteen years. The remaining 22% is equally represented at each extreme of this age range. (Appendix 4a, Table 3).
- (d) Diagnosis: A large majority of the sample had been diagnosed as cerebral palsied (90% or 141) while approximately 8% suffered from either some other type of brain injury or another disability. (Appendix 4a, Table 4).
- (e) Mobility: 76% of the population was dependent upon a wheelchair for mobility (57% dependent - in a wheelchair; 11% hand-operated wheelchair; 8% hand-operated electric wheelchair). 10% walked with an aid while 11% were able to walk independently. (Appendix 4a, Table 5)

- (f) Previous Experience with Symbols: Due to the widespread use of symbols in some settings the total sample was divided into groups of "experienced" and "inexperienced" symbol users, with experience being considered as an independent variable. (Appendix 4a, Table 6)
- (g) Grade Level: Forty-eight children (31%) were in programmes for the retarded when they began symbol instruction, with the remaining 109 (69%) being instructed in academic programmes. Most of the latter group (approximately 60%) were at early elementary school levels (pre-kindergarten to grade 1). (Appendix 4a, Table 7a, b).
- (h) Intellectual Level: Ratings of intelligence levels as formally assessed were recorded in all cases where results were available. In all cases a clinically "observed" intelligence rating was obtained from the child's instructor.
- (i) Assessed I.Q.: One hundred and thirty-one children had been formally tested, with 47% being assessed as mildly or moderately retarded. The mean assessed I.Q. for this entire group was in the mildly retarded range.
- (j) Observed I.Q.: Instructors' ratings of observed I.Q. were roughly equally distributed across the moderately retarded to average range of functioning, with a mean observed I.Q. in the borderline retarded range. (Appendix 4a, Tables 8, 9). Fifty-seven percent of the children were described as "very alert", with 39% demonstrating "some interest" in materials presented to them. (Appendix 4a, Table 10).
- (k) Language Comprehension: Thirty-six percent of the children were assessed as functioning at a language comprehension that was grossly below their age level. The children operating at two years below age level or lower represented over 63% of the population. A very small percentage (12%) appeared to be at or

above their age level and a significant number were not stated (20%. (Appendix 4a, Table 11).

2.

2. OTHER VARIABLES

Since it was assumed that the child's speech, hearing and vision would have a direct bearing on educational programming and perhaps on his use of and ability with symbols, it became important to describe the population in regard to these variables. One hundred and twelve (112) children, 71% of the population, had a "poor" speech prognosis. Only 3% had an indication that the prognosis was good for speech. (Appendix 4a, Table 12). It is understandable then that 74% (or 114 children) were using symbols as a substitute for speech, while 20% were utilizing this system as a complement to their existing speech. It might also be noted here that 6% or ten children, were using symbols as a complement to speech although it had been intended as a substitute (Appendix 4a, Table 13). Approximately two-thirds of the children had had a formal speech assessment within the previous year, an essential step in assessing the child's ability to communicate or the usefulness of an alternate system (Appendix 4a, Table 14). The auditory modality appeared to be quite adequate in these children as does visual capacity. Seventy-five percent (75%) have "good" or "excellent" auditory attention (Appendix 4a, Table 15) and 67% show the same rating on the capacity to learn via this medium (Appendix 4a, Table 16). Eighty-six percent (86%) of the 94 cases in which a hearing assessment was conducted, demonstrated normal hearing, with 11% indicating some loss. (Appendix 4a, Table 17). Sixty-three children had no formal hearing assessment. Insofar as the visual assessment is concerned, 48% of the children were estimated to have a good capacity for visual learning. (Appendix 4a, Table 18). This capacity was rated as "good" or "excellent" for sixty-seven percent. Seventy-one percent of the children were given this same rating concerning their ability to attend to visual stimuli. (Appendix 4a, Table 19). Approximately one-quarter of the population was rated at "fair" or below, which corresponds

to the 20% who were indicated to have visual problems (Appendix 4a, Table 20).

Forty-seven percent of the population were recorded as experiencing strong frustration, with the remaining children being evenly divided between experiencing weak and moderate degrees of frustration (Appendix 4a, Table 21).

3. SUB-POPULATION

Since it was considered desirable to obtain qualitative or casuistic information with regard to individual programs, a sub-population of symbol users was selected. In addition to the quantitative data collected from all the instructors in the study, personal interview data were obtained from the instructors of this sub-population. Selection of the sub-population of symbol users and instructors was based on reasonably close geographic proximity to Toronto and on the program types and population characteristics which would make this sub-group of children representative of the total subject sample used in the study.

The types of programs which were included in the sub-population and which were considered necessary to make it representative of the total subject sample were:

- (a) Programs in which children were instructed in residential institutional settings of 100 or more;
- (b) Programs for children living at home;
- (c) Program in which symbol users were instructed in a mixed class of symbol and non-symbol users;
- (d) Programs consisting of all symbol users;
- (e) Programs having only one symbol user in a class and/or setting.

The population characteristics which were considered were:

- (a) Symbol users to be distributed throughout the following age ranges; 5 years and younger; 6 to 12 years; 13 to 19 years; 20 years and over.
- (b) Symbol users to be distributed throughout the following learning categories: quick, average, slow learners.

The sub-population was initially composed of 34 instructors representing 19 settings and one hundred and eleven children. Due to attrition over the course of the study and the re-allocation of children to different settings, the final sub-population consisted of twenty-seven instructors from sixteen settings instructing ninety-five children. (Appendix 4a, Tables 22 through 29 present data on the children of the sub-population.)

Data were collected from the sub-population instructors at six-month intervals from December 1974 to December 1975.

D. Description of Instructional Settings
within Total Population

1. TYPE OF INSTITUTION

The settings from which data were received existed in twenty-seven locations across Canada and the United States and extended from Ottawa and Montreal in the east to British Columbia in the west and to Atlanta, Georgia in the south. They included classrooms in regular schools, schools for the retarded, training institutions for the retarded, children's chronic care hospitals and residences, rehabilitation centres for the handicapped and special classes within larger academic institutions. In several instances one recording instructor returned data relating to more than one classroom program.

2. TYPE OF CLASSROOM

Three types of classroom arrangements were identified:

- (a) The single symbol user in a classroom with other speaking students;
- (b) The mixed classroom that includes more than one symbol user along with speaking children; and
- (c) The classroom that is composed of only symbol-using children.

Of the 62 classrooms for which descriptions were received, there were twenty-six classes with only one symbol-using child in the class, twenty-six mixed classes of symbol users and speaking children, and ten classes composed of only symbol-using children.

3. DESCRIPTION OF SYMBOL INSTRUCTORS

PROFESSIONAL DISCIPLINE:

The symbol instructors represented a variety of professionals. Sixty percent were teachers; twenty-eight percent were speech pathologists/therapists; four percent were mental retardation counsellors or psychologists. While each setting had a particular professional with major responsibility for the symbol programme, other professionals (ranging in number from 1-5) were also involved and had direct contact with the children in their use of symbols. (Appendix 4a, Table 30) By tallying the stated degree of involvement for specific professional staff in various settings the following ranking, according to degree of involvement with the children's symbol program was obtained:

1. Teacher
2. Speech Pathologist
3. Occupational Therapist
4. Physiotherapist
5. Psychologist
6. Administration
7. Matron
8. Social Worker
9. Doctor
10. Recreation Staff
11. Nurse
12. Other (e.g. bus driver, volunteer aide)

EXPERIENCE OF INSTRUCTORS:

Experience of the instructor was examined both with regard to the teaching of the physically handicapped child, and with respect to the teaching of symbols. The majority (95%) of the children at the beginning of the project had instructors with one to two years experience or more with the physically handicapped. Relatively few (5%) of the children had teachers who were new to the field of teaching handicapped children. (Appendix 4a, Table 31).

With regard to experience in teaching symbols, thirty-five percent of the children had instructors with one to two years experience, with an almost equal number (31%) having instructors new to symbol programming; i.e. experience only within the six months prior to the outset of the research program. Very few instructors had more than two years experience with symbols, due largely to the recent discovery and introduction of the Blissymbolics system. (Appendix 4a, Table 32).

The "typical" symbol instructional setting can be described as teacher-directed, although she had assistance from one or two other professionals (most likely a speech pathologist or an occupational therapist). The teacher's involvement is usually greater than it is for the other involved professions. Although the teacher has one or more years experience with physically handicapped children in her professional capacity, she is relatively new to symbols.

Frequently there is a speech pathologist who takes responsibility for regular speech and communication instruction, with follow-through of symbol instruction being undertaken by the classroom teacher.

III METHODOLOGY

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Information was gathered through the following instruments and procedures:

- (a) Recording materials relating to the symbol user;
- (b) Recording material relating to the instructor;
- (c) Interviews;
- (d) Questionnaires;
- (e) Workshops for research instruction.

A. Recording Materials Relating
to the Symbol User

1. INITIAL AND FINAL DESCRIPTION (I.D.F.)

- (a) Personal vital statistics on the child;
- (b) His past and present status with symbols;
- (c) A number of items on his physical condition;
- (d) His educational placement history;
- (e) Speech information;
- (f) Psychological assessments (formal) and evaluations of the child and his attitude to communication; and
- (g) His visual and auditory abilities.

2. PROGRESS REPORT (P.R.)

SECTION 1 - COMMUNICATION (Comm.)

- (a) The means of communication used by the child (e.g. gestures and word board);
- (b) The child's level of symbol communication;
- (c) The equipment needs of the child in order to communicate;
- (d) The language model being presented to the child;

- (e) The child's skill with symbols (e.g. strategies, support needed, creativity);
- (f) Formal speech and hearing assessments.

SECTION 2 - SOCIAL: (Soc.)

- (a) With whom the child communicated and the quality of this communication;
- (b) To what extent the child used symbols to communicate (i.e. what places).

SECTION 3 - ACADEMIC: (Acad.)

- (a) Time allocated by instructor to various academic activities;
- (b) An estimation of the child's academic level;
- (c) Visual ability;
- (d) Readiness materials utilized;
- (e) Colour, shape and complexity levels of understanding for reading level;
- (f) The reading approach used and instructional method;
- (g) Symbol integration into reading programme;
- (h) An evaluation of the child's reading proficiency;
- (i) The frequency of reading.

SECTION 4 - PSYCHOLOGICAL: (Psych.)

- (a) The results of the last formal psychological assessment;
- (b) A rating of the integration of symbols into the child's world; and
- (c) A rating of the child's attitude toward learning new symbols.

3. ON-GOING PROGRESS REPORT

This report includes information on:

- (a) Attendance;
- (b) Symbol displays used;

- (c) Introduction of symbols;
- (d) Reading series (if used);
- (e) Symbol creations;
- (f) Changes of behaviour that were noted.

B. Material Relating to the Instructor

]. PROGRAM PROGRESS REPORT (P.P.R.)

- (a) The instructor's experience;
- (b) The interaction between symbol classes and other classes;
- (c) The type of program;
- (d) The number of symbol users and non-symbol users;
- (e) Program changes in personnel, extra instructional aids, additional special resources, preparation time, demands and facility to program in other areas;
- (f) Newly created symbols created by a group in a classroom.

Each instructor was provided with a supplement which detailed all procedures and response techniques and included a glossary of terms. All recording materials were designed to be easy to complete and of practical value to the instructor.

2. INTERVIEWS

Three interviews were conducted with the sub-population instructors during the course of the research study. The format was informal, with common interest in symbols on the part of interviewer and interviewee contributing greatly

to good rapport. The interviews were designed to collect information regarding the variation and similarities in programming, materials being developed for symbol instruction, the procedures being undertaken to generate and maintain active interest among people interacting with the symbol user, future programming goals and needs, and suggested areas for future research.

3. QUESTIONNAIRES

INSTRUCTORS' QUESTIONNAIRES:

Midway through the study and upon conclusion of the study, two questionnaires were distributed to instructors with the intent of obtaining further details regarding current symbol displays, symbol programming, unmet needs, and parental involvement: questionnaires also explored concerns relating to the inappropriateness of symbol communication for certain students.

PARENTS' QUESTIONNAIRE:

In May 1975, a questionnaire was distributed to all parents of children residing at home who were engaged in the Evaluation Study. This was an exploratory survey intended to:

1. Further describe the family population with which we were dealing;
2. Ascertain how the child was communicating at home (i.e. with symbols);
3. Further explore problems and expectations of parents.

C. Workshops for Research Instructors

1. INTRODUCTORY WORKSHOP

Held at the beginning of the study (November 1975). Research instructors were given an overview of the study, detailed explanation of recording materials and opportunity for discussion and questions.

2. EVALUATION WORKSHOP

Held five months following the last recording (May 1976). Research instructors were presented with preliminary research findings and participated in discussions relating to the evaluation of research findings.

The general objectives for data collection were: appropriateness of procedures to both Canadian and American settings, recognizing that they contained populations which were heterogeneous with regard to age, experience with symbols, intellectual ability, academic and residential placement, degree of disability, ease of responding, practical usefulness to the instructors in monitoring and evaluating the instructional program.

D. Evaluation of Recording Instruments and Procedures

Through the feedback from instructors, obtained through interviews and the Evaluation Workshop, recording instruments and procedures were evaluated as increasingly easy to utilize, useful as informal recording tools, and generally relevant (the major exception being the limitations of the Progress Report and On-going Progress Report for use with symbol users at the lower intellectual levels).

IV RETURNS

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Although forty-four settings, representing one hundred and ninety-six (196) children originally agreed to participate in the study, attrition reduced these numbers before returns for December 1974 were due. Reasons given for withdrawal were varied, but included insufficient staff, no appropriate children and poor administrative support (financially). It should be noted here, that research participation was made contingent upon attendance at the first Research Workshop held in Toronto, November 1974, where instructors would receive all materials and very detailed and thorough instructions as to the recording and return procedure. For the December 1974 recording, returns on one hundred and fifty-seven (157) children, from thirty-two (32) settings were received. This is the group which was considered to comprise the research population.

The following chart illustrates the changes in numbers of symbol users and settings from which returns were received each recording period.

Table 1

RETURNS

<u>Recording Period</u>	<u>Number of Children Receiving Returns On</u>	<u>Number of Settings Receiving Returns From</u>
December 1974	157	32
March 1975	147	31
June 1975	139	30
September 1975	122	27
December 1975	130	21

By the final recording deadline (due December 1975) the population was reduced by twenty-seven (27) children in eleven settings. The final population figures were one hundred and thirty children in twenty-one centres. Some centres who had been unable to return a September recording, but who were not discontinuing (see Appendix 8) their children, returned December 1975 data, accounting for the increase in symbol users from September to December 1975.

V DATA ANALYSIS

pages 19 - 36

A condensed overview of the data analysis is included here to provide instructors with information as to the questions which were explored through quantitative analysis. Many other questions were asked in the study; these were more suitably answered through casuistic (relating to one or more individual cases) information, and are presented in other chapters. It was felt by the researchers that both kinds of data were required to provide useful information for evaluating the effectiveness of such a new communication system.

A. Outline of the Study

1. DESIGN

Due to the diversity of the population with regard to age, I.Q., experience, disability, etc., it was not possible to establish a control group for comparison. This does not invalidate the data presented, it means only that conclusions may not be formulated as strongly as could have been done were a control group available. Through gathering information on each symbol user on each of the dependent variables at the beginning and end of study, as well as at regular intervals throughout the study, each symbol user was considered as serving as his own control.

2. ORGANIZATION

This is the layout of the organization plan to follow:

- (a) The numbers of the questions asked of the research are numbered on the left side of the page.
- (b) The questions are printed on the right side of the page.

- (c) The operations and operants are presented in blocks and centered.
- (d) The location reference within (a) the Evaluation Study and (b) within the Research Report is specified under the question number. More detailed information regarding the data analysis can be found in the Formative Evaluation of the Ontario Crippled Children's Centre Symbol Communication Program Research Report (Silverman, 1976).

Question 1:

How were the data gathered?

- a) Evaluation Study:
Methodology section

- b) Report:
Chapter IV
Appendix x

P.R.
(Progress Report)

Question 2:

How did we analyse the data?

- a) Evaluation Study:
Data Analysis section

Raw Data

- b) Report:
Data Analysis
Section 1
Appendices i,
iii, iv

Coding, Quantification,
Variable Identification
and Naming

Question 3:

What do the data look like?
(i.e. How many subjects of
certain age, sex, I.Q.,
experience level, etc., are
there in the population?)

- a) Evaluation Study:
Population section

- b) Report:
Description of
the Population
Appendix ii

Frequency Data

Question 4:

a) Evaluation Study:

Data Analysis
section
Appendix 5

b) Report:

Data Analysis
Section 3
Appendix vi

Comparison of Dec. '75 and
Dec. '74 data. (Method
t-test for related
samples)

What was the change due
to the year-long Symbol
Communication Instruc-
tion Program?

Question 5:

a) Evaluation Study:

Data Analysis
section
Appendix 6

b) Report:

Data Analysis
Section 3
Appendix vi

A number of Analyses of
Variance (ANOVA) were
carried out with the
variables:

- a) Age (3 levels)
- b) I.Q. (2 levels)
- c) Experience (2 levels)
- d) Disability (3 levels)

What is the effect of
the variables Age, I.Q.,
Experience and Disability
on the communication,
academic and social
variables?

Question 6 & 7:

a) Evaluation Study:

Data Analysis
section

b) Report:

Data Analysis
Section 4
Assessment
Section
Appendices vii,
viii, ix

A number of Regression
Analyses were performed
in which the SYMSKILL
score (a cluster score of
several communication
measures), served as a
criterion against which
the contribution of other
related variables (Commu-
nication, Academic,
Psychological, and Social)
were weighted.

What are the variables
that give the best
prediction of a subject's
skill with symbols
(SYMSKILL) both in the
short and the long term?
Is there a difference
between the experienced
and inexperienced
subject population?

Question 8:

a) Evaluation Study:

Data Analysis
section

b) Report:

Data Analysis
Section 5

The correlations of all
variables in SYMSKILL
with the total SYMSKILL
score was computed.

Of all variables that
are combined into the
SYMSKILL score, is it
possible to point out
some that could be used
as single predictors of
a subject's skill with
symbols?

3. CODING THE DATA

It was decided to use the December, 1974 and December, 1975 Program Progress Report (P.P.R.) data for quantitative analysis as these recording periods provided more information than the other periods. The March, June and September (1975) returns were of more importance as sources of casuistic information. The items from the Program Progress Report which were coded could be categorized into 4 groups:

1. Items which were quantitative: e.g. Age, Experience, I.Q., Number of symbols used by the child;
2. Items for which the options did not have an intrinsic numerical value attached to them but which could be regarded as existing on a continuum ranging from poor to excellent, or low to high, etc.;
3. Items which could only be coded as "yes", "no", or "not applicable", to which answers a number could be arbitrarily assigned.
4. Items which required a ranking or ordering of the subject's performance by the instructor. In these cases the rank was recorded (e.g. instructors were asked to rank on a fixed choice question from 1 to 5, those with whom the child communicated the most.).

4. VARIABLES IN THE ANALYSIS

The total number of variables in the analysis was 160. A close correspondence was retained between the items in the Program Progress Report and the variables derived from those items (see Appendix 1). A variable corresponded with a question or part of a question from the P.P.R. Like the

items of the P.P.R., the variables could be divided into those relating to the Initial and Final Description (IDF), Communication, Academic, Psychological and Social aspects of the subject's performance.

Some variables stand out for their importance in the study. These independent (or experimental) variables are:

- (1) I.Q. (the observed I.Q. score coded as Retarded: less than or equal to 79, or Non-retarded: over 80);
- (2) Experience (the level of experience of the subject coded as Experienced: prior to August 1974, or Inexperienced: after September 1974);
- (3) Age (coded into ages 1-5, 6-9, 10-15, 16 and over, for 1974; collapsed to three categories in 1975);
- (4) Disability (the degree of disability is a compound score -- see Appendix 2--and has been coded into three categories of mild, medium and severe).

A fifth variable of importance was *skill in symbols* (SYMSKILL). It contained five communication items, the scores for which had been added together and recorded as a cluster score representing a subject's skill with symbols (see Appendix 2 for coding explanations).

It will be noticed that the dependent variable names are italicized. This is a convention which will be adhered to in this chapter. If a variable name is used without elaboration the reader is referred to Appendix 1 where the complete significance of the variable in its relation to the P.P.R. item is recorded.

The basic characteristics of the subject population presented in the Description of the Population used data from December 1974 and December 1975 recordings. The variable

names correspond to those used here and in Appendix 1. The quantitative analysis did not concern itself with the sub-population described in the Population section.

Since the distribution of the subjects in the sub-population for the important descriptive variables was very similar to that in the total population and since the number of subjects not included in the sub-population was very small, it was decided to analyse only the total population.

B. Change Due to the Year Long Symbol
Communication Instruction Programme

1. IN THE TOTAL POPULATION

The question "Was there a positive change?" can be unreservedly answered in the affirmative. Forty-nine of the 160 variables were selected for comparison. The rest were omitted because:

- (a) No change was possible, e.g. age, sex;
- (b) There were scoring difficulties; or
- (c) There were insufficient data.

Of the 49 variables that were compared, 32 showed a significant positive change, 2 changed in the reverse direction and 16 did not show a significant change. From a consideration of the specific variables, it will become clear that these results are better than the quoted numbers indicate. (The variables, the number of cases (n) and the probability level (p) can be found in Appendix 5.)

POSITIVE CHANGE:

The following variables were found to have moved in a positive direction from December 1974 to December 1975:

- 1. *Interest in communication;*

2. *Integration of symbol communication;*
3. *Number of symbols related to;*
4. *Child's Attitude to learning new symbols;*
5. *Integration of symbols into reading activities;*
6. *Reading score;*
7. *Colour concept;*
8. *Ability to select one picture from many;*
9. *Ability to select one shape from many;*
10. *Integration of symbols into reading materials;*
11. *Reading proficiency;*
12. *Nature of social interaction (i.e. from attention-getting to initiation); and*
13. *All of the communication variables studied, with the exception of Speed (Ability) to learn symbols.*

NEGATIVE CHANGE:

There was only one variable which exhibited significant negative change: the *Observed language comprehension* level. Only a tentative explanation for this unexpected result can be offered without further research. It is possible that with the instructors having improved feedback because of symbol communication, their evaluation of language comprehension levels could be more realistic with less tendency to over-evaluate.

2. IN THE RETARDED SUBJECTS

The change scores for the retarded subjects have an identical significance pattern, except for:

1. *Observed I.Q.;*
2. *Alertness;*
3. *Language arts time;*
4. *Assessed language comprehension.*

Observed I.Q. scores as well as *Alertness* and *Language arts time* allocation showed a significant increase for this subject

group, while *Assessed language comprehension* did not change significantly as it did in the total population.

C. The Effects of I.Q., Experience, Age and Disability

1. RATIONALE FOR SELECTION

The purpose of looking at these variables was that we might reasonably assume that they were not subject to change resulting from the program. Each one of the variables describes the subject in what was expected to be a significant aspect of his existence and capacity. In other words the variables measured stable characteristics of the subject which might reasonably be expected to influence his performance in the symbol program. It was therefore important to determine the effect of the independent variables (I.Q., Experience, Age and Disability) on the other dependent variables. It was with this in mind that the heading for this section was explored. (See Appendix 4(b), Tables 1 thru 4).

2. THE EFFECTS OF I.Q. AND AGE ON PERFORMANCE

CODING:

Subjects with an I.Q. score from 10-79 were assigned to the retarded sub-group and subjects with an I.Q. score of 80+ were assigned to the non-retarded group. Age was divided as follows: subjects 1-5 years; subjects 6-11 years, subjects 12-15 years; and those 16+ years (see Appendix 2). I.Q., then, has two categories while Age has four. A positive effect with either the I.Q. or Age variable indicates the correspondence of a high score on Age or I.Q., with a high score on that variable listed.

POSITIVE EFFECTS OF I.Q. (1974):

I.Q. was found to have a positive effect on the following variables:

1. Alertness;
2. Reading score;
3. Means of communication;
4. Interest in communication;
5. Integration of symbol communication into other areas;
6. Attitude to learning new symbols;
7. Ability to deal with listener's misunderstanding;
8. Skill areas;
9. Highest skill area;
10. Proficiency with symbols;
11. Skill in symbols;
12. Number of symbols in best sentence;
13. Number of symbols in typical sentence;
14. Speed of learning symbols;
15. Interest in creating new symbols;
16. Number of settings.

Thus, it may be said, for each of these variables, that a high I.Q. was found to correspond to a high degree of Alertness, (or Reading score, etc.) and vice versa. There were no variables negatively affected by I.Q. (that is, the higher the I.Q., the lower the variable score).

POSITIVE EFFECTS OF AGE (1974):

With the exception of Alertness, the Age variable had a positive effect on the same variables as I.Q., again demonstrating the correspondence between higher ages and higher scores on each variable. The finding that the same variables are positively affected for both I.Q. and Age, enables one to postulate that brighter and older subjects produce better scores on these variables.

NEGATIVE EFFECTS OF AGE (1974):

Age was found to have a negative effect on:

1. *Number of play materials (utilized by the child, providing "symbol readiness");*
2. *Incorporation of symbols into play materials;*
3. *Time for listening;*
4. *Time for communication;*
5. *Time for reading.*

As might be expect, the older subjects utilized fewer play materials and the amount of symbol incorporation in play diminished. While older subjects spent less time engaged in listening activities, the middle age groups (i.e. 6-15 years) spent more time on communication and reading activities than either younger or older groups.

INTERACTION EFFECTS OF AGE AND I.Q. (1974):

An interaction exists when the effects of I.Q. and Age are not independent of each other or when Age, for example, has a certain effect at one I.Q. level and no effect or much less effect or even an opposite effect at the other I.Q. level. The same might happen with I.Q. at different Age levels. The following variables showed a significant interaction between these two variables:

1. *Number of play materials (utilized by the child, providing "symbol readiness");*
2. *Incorporation of symbols into play materials;*
3. *Reading score;*
4. *Number of symbols in best sentence;*
5. *Number of symbols in typical sentence;*
6. *Interest in creating new symbols;*
7. *Skill in symbols.*

The means of the *Number of play materials* and the *Incorporation of symbols into play materials* decreased over Age. This decrease was much larger for the non-retarded subjects than for the retarded subjects (see Appendix 4(c),

Tables 1 and 2). There appeared to be very little symbol incorporation in play materials for the young and old groups of the retarded (i.e. 0-5 and 16+) and the older non-retarded group.

Although *Reading score* showed a substantial increase over Age for both I.Q. groups, the pattern differed. While the means for the retarded group increased over Age, reaching their highest value in the older group (16+), the non-retarded group's means peaked in the 12-15 year age group and declined in the old group (see Appendix 4(c), Table 3). It might be noted here that generally education for the non-retarded physically-handicapped person now over 16 had not been available when they were younger.

Interaction was also demonstrated in the next three variables: *Number of symbols in best sentence*, *Number of symbols in typical sentence* and *Interest in creating new symbols*. This interaction effect was due to the fact that the means for the retarded subjects remained virtually the same or increased slightly over Age (with the two younger groups combined), while the non-retarded means showed a substantial increase over Age (see Appendix 4(c), Tables 4, 5, 6). It is this differential effect of levels of Age and I.Q. that is reflected in the significant interactions. The same interaction occurred in *Skill in symbols*.

I.Q. AND AGE EFFECTS FOR 1975:

On the whole, the effects of I.Q. and Age were less pronounced in 1975 than in 1974. Due to attrition it was necessary to recode the Age factor. This may invalidate a direct comparison of 1974 and 1975 Analysis of Variance results. (For detailed discussion of the 1975 variables for which there were sufficient data and which showed a different significance pattern between 1974 and 1975, see the Research Report (Silverman, 1976).)

3. THE EFFECTS OF I.Q. AND EXPERIENCE, AND AGE AND EXPERIENCE

CODING :

The Experience factor has two levels, inexperienced and experienced. In this study, with such a diverse population, the Experience factor can only be considered when a comparison is made in December 1974 between the group of symbol users with 0 to 3 months experience (inexperienced) and the group of symbol users with 4 months to a maximum of 3 years, 3 months experience (experienced).

When the comparison is made in December 1975 between symbol users who now have 1 year to 1 year, 3 months experience (inexperienced) and symbol users with 1 year, 4 months to 4 years, 3 months (experienced), the differences level out.

POSITIVE EFFECTS OF EXPERIENCE AND AGE:

Only three variables from 1974 were examined with regard to effects of Experience and Age:

1. *Child's frustration*
2. *Means of communication*
3. *Ability to deal with listener's misunderstanding*

The effect of Experience was significant for the *Means of communication* indicating that experienced subjects had more means of communication available to them than inexperienced subjects. The Age effect on the *Ability to deal with listener's misunderstanding* was significant, indicating that older subjects were better able to cope with this situation.

NIL EFFECTS :

Experience and Age showed no effect on the *Child's frustration* and degree of Experience did not affect the *Ability to deal with listener's misunderstanding*. There were no significant interactions.

POSITIVE EFFECTS OF I.Q. AND EXPERIENCE :

Here, there were three variables examined with regard to 1974 data:

1. *Means of communication*
2. *Interest in communication*
3. *Interest in creating new symbols*

The variables positively affected by I.Q. in 1974 were *Interest in Communication* and *Interest in Creating New Symbols*. It appears then, that higher I.Q. scores are associated with higher scores on these variables and vice versa. Since these relationships appear elsewhere as well, it may be concluded that I.Q. is a strong determinant of symbol skill.

Experience showed a positive effect with *Interest in creating new symbols* on the 1974 data.

Means of communication showed an interaction effect in 1974 (see Appendix 4(c), Table 7), showing that the experienced subjects scored higher than either inexperienced group. It is interesting to note, however, that the Inexperienced non-retarded subjects scored lower on the variable than their retarded counterparts.

4. THE EFFECTS OF DISABILITY AND EXPERIENCE

CODING:

Disability has been divided into three levels, mild, medium and severe (see Appendix 2).

POSITIVE EFFECTS OF DISABILITY AND EXPERIENCE:

The variables examined with regard to this breakdown were:

1. *Number of settings;*
2. *Highest skill area attained;*
3. *Proficiency with symbols;*
4. *Skill in symbols;*
5. *Integration of symbol communication;*
6. *Number of symbols in best sentence;*
7. *Number of symbols in typical sentence;*
8. *Skill areas;*
9. *Attitude to learning new symbols;*
10. *Nature of social interaction.*

Disability was found to have a positive effect in 1974 on variables 1 through 5, while Experience (in 1974) was positively affecting variables 1 through 5 and 8 and 9. All other variables showed no effect. While both Experience and Disability showed an effect on variables 1 through 5, the effect of Disability was somewhat more complex. The scores of the subjects in the medium disability group were higher than both the mildly and the severely disabled subjects. There were no interaction effects.

CHANGES IN 1975 DATA:

In 1975 all the effects of Experience had vanished as had many of the Disability effects. (For detailed discussion regarding the variables which were not significantly affected by Experience and Disability in 1974 but were affected in 1975, and interactions which emerged, see the Research Report (Silverman, 1976).)

5. THE VARIABLES THAT GIVE THE BEST PREDICTION OF SKILL IN SYMBOLS

SHORT TERM PREDICTORS:

Also referred to as monitor or assessment variables, these were variables measured in the 1974 data that were

believed to be predictors of skill with symbols. Of the 32 independent variables in the study, it was expected that some would be more strongly related to the *Skill in symbols* score than others. It is these variables which would be useful as predictors of a subject's symbol skill. The monitor variables for inexperienced subjects in December 1974, in order of importance, were:

1. *Ability to deal with listener's misunderstanding;*
2. *Number of symbols related to;*
3. *Interest in creating new symbols;*
4. *Speed of learning symbols;*
5. *Assessed I.Q.*

For inexperienced subjects in December 1975, in order of importance:

1. *Ability to deal with listener's misunderstanding;*
2. *Number of symbols in best sentence;*
3. *Number of settings;*
4. *Number of symbols in typical sentence;*
5. *Alertness.*

For experienced subjects in December 1974, in order of importance:

1. *Interest in creating new symbols;*
2. *Number of symbols;*
3. *Number of symbols in typical sentence;*
4. *Interest in communication;*
5. *Ability to deal with listener's misunderstanding;*
6. *Smallest picture size.*

For experienced subjects in December 1975, in order of importance:

1. *Ability to deal with listener's misunderstanding;*
2. *Number of symbols;*
3. *Number of settings;*
4. *Number of symbols in best sentence;*
5. *Types of statements.*

Overall, it is evident that the *Ability to deal with listener's misunderstanding* and the *Number of symbols* are very consistent predictors of skill with symbols.

LONG-TERM PREDICTORS:

Long-term predictors were directed towards selection of a set of variables which would predict the subject's *Skill in symbols* score to be obtained in the (near) future.

The long term predictor variables for the inexperienced subjects, in order of importance, were:

1. *Attitude to learning new symbols;*
2. *Ability to learn auditorily;*
3. *Number of symbols related to;*
4. *Reading score;*
5. *Ability to deal with listener's misunderstanding.*

For experienced subjects, in order of importance:

1. *Number of symbols in typical sentence;*
2. *Number of settings;*
3. *Reading score;*
4. *Types of statements;*
5. *Child's frustration.*

It was found that the scores on the *Child's frustration* behaved in the opposite way to those of the other predictors: that is, a high score on frustration meant a low score on *Skill in symbols* and a low frustration score meant a high skill score. It could be that those who scored high on SYMSKILL were experiencing less frustration, as they had a more adequate means of communication. For the long-term predictors there was a clear distinction between inexperienced and experienced subjects. The former had as important predictors only non-symbol-related variables, while the experienced subjects' future performance on *Skill in symbols* was predicted by their present ability with symbols as measured

by the variables *Number of symbols in typical sentence* and *Types of statements*.

6. SKILL IN SYMBOLS

The individual variables composing this score were examined with regard to their relationship with *Skill in symbols*. The variables correlating highest with *Skill in symbols* were the ones that could be used as single best estimations of the subject's *Skill in symbols* (see Appendix 5, p. 149). The child's *Proficiency with symbols* was the single best indicator of the subject's symbol skills as measured by this variable. If interest was in a quick assessment of the child's current functioning, then the *Proficiency with symbols* score would give us the best information short of gathering all data necessary to compute the *Skill in symbols* score.

7. INSTRUCTOR RELIABILITY

Recognizing the variability and bias that could be found in a study dependent on instructor ratings, an improvised reliability test was performed at a research workshop. The test involved assessment of a child on certain variables, after the instructors had viewed a four - minute tape on each and had been given some descriptive information. It was found that the reliability of instructor ratings was very high or that there was very little bias in the instructors' judgment. A similar finding emerged with regard to the rating regardless of the particular children. If indeed, the instructors' ratings of the children in the main study are as reliable or as unbiased as those of the experiment, this adds to the value of the data gathered in the main study and to the results of the analysis and finally, to the conclusion drawn in this and other chapters.

8. CHANGE IN PERFORMANCE

For both the total population of subjects and for the retarded subjects, the change in performance between 1974 and 1975 was impressive. Although change occurred in the whole population, it was repeatedly more pronounced for the retarded, inexperienced, younger and moderately (and severely) disabled subjects. This is a very rewarding result, and although controls were difficult to establish and factors other than the symbol instruction program could have had an effect on both instructors and subjects (for example, the "Hawthorn effect"), the positive impact of the program appeared strong.

9. THE EFFECTS OF I.Q., AGE EXPERIENCE AND DISABILITY - SUMMARY

It would appear from the data analysed that I.Q. and Age are the most important factors having effect on some assessment variables and a strong and consistent effect on communication and academic variables. The effect of Experience was present in 1974 but had all but vanished in 1975. It was found to make a slight difference to *Skill in symbols* however.

The effect of Disability was generally as expected in that the moderately and severely disabled subjects often performed better than the mildly involved group.

VI RESEARCH DATA

pages 37 - 101

A. The Symbol System

1. EVALUATION OF VOCABULARY USAGE

Table 34 (Appendix 4(a)) is illustrative of a summary of the total population showing a general trend of category usage from beginning of study (December 1974) to end of study (December 1975). Analysis under specific age groupings brings some more unique concerns particular to each group to light. High-volume recording appeared to be the rule throughout the study period to the following categories:

	<u>Dec. '74</u>	<u>Dec. '75</u>
Yes/No	89%	91%
Things	88%	95%
People	83%	93%
Emotions	81%	92%
Actions	77%	92%

A higher frequency of the use of actions was found by the end of the study, as the majority of symbol users progressed in their skills and proficiency with the system. It is also not surprising that use of descriptive words increased with dexterity in the system. Many differing attitudes were found to exist with regard to the use of manners and question words, but these will be examined more closely according to a breakdown into age categories. (see Vocabularies section of Handbook, p. 160)

In December 1974, "Questions" and "Manners" were used least frequently. Their relative position with regard to frequency of use was maintained in December 1975; however, the amount of use had increased - 85% of the population were using Descriptive words. The least used category was Questions - with 70% of the population using them.

There was a general trend toward expansion of all vocabulary categories and more extensive use over a one year period. Similarly, there was also a tendency for the negative usage (or non-use) categories to decrease while the positive groups continued to move in an upward progression.

PARTS OF SPEECH:

(1) High Frequency of Use :

Nouns were ranked as the most frequently used part of speech in December 1974 and December 1975. The general trend showed a small increase from 79% to 87% as the most frequently used part of speech. This finding is not surprising, since nouns are generally considered to be high information words, especially in the telegraphic type sentence structure which is often associated with symbol output. With the present discrepancies in the literature, accurate estimates of the average vocabularies of speaking children for any age level are practically impossible. In an attempt to measure the proportions of various parts of speech from a sample of running conversation, nouns seem to comprise only about 20% of the total words used. This is often felt to be largely due to the necessities of sentence structure and naturally, other percentages are shifted accordingly (McCarthy, 1966). It is speculated that the higher frequency of noun usage in symbol communication results from the many instances where nouns serve as high information bearing words. Other categories of words often needed for "good" oral communication are omitted.

It should also be noted that the rankings for third and fourth parts of speech showed very small fluctuations among verbs, adjectives and pronouns all occurring between 10-20% in December 1974. For adjectives and pronouns, there was an increase to 53% - 71% and for verbs, to 23% by December 1975.

(2) Rarely Used:

It was found that auxiliary verbs, articles, conjunctions, adverbs, "wh." questions, negatives, prepositions, secondary verbs and noun modifiers were utilized with very low frequency by students in December 1974. This finding comes as no surprise, since children who were in the early stages of development of symbol communication would not have the expertise to utilize such sophisticated structures. It is suggested that these structures would be used more extensively with the introduction of more complex syntactical structures (see Appendix 4(a), Table 35).

By the end of the recording period general use of all of the parts of speech previously grouped as rarely used showed a moderate degree of usage. While there was still a low frequency of use in many categories, there were notable increases in use of prepositions, auxiliary verbs, noun modifiers and wh. questions.

The category of children's questions has always received special attention in the literature, not only in major development studies, but also from such noted people as Piaget. There is little agreement among the various studies in regard to the types of questions asked. The playful and attention-seeking character of many of the speaking child's questions may be stressed, since children, in building up their knowledge in various areas often ask questions to which they already know the answer. The same may hold true for the symbol population, as they seek gratification in their newly established mode of communication. Presently, the puzzle remains unsolved as to which question words and how many question words should be included at various levels of symbol use.

2. EVALUATION OF SYMBOL USAGE

The symbol strategies have all been relocated to the top of the standard 400 B.C.F. display (Revised December 1975). Separation of the strategies from the remainder of the vocabulary was done for ease of location. It facilitated communication to have all strategies located in one area; it was felt, however, that the arrangement of the strategies within that location should be flexible so that the most frequently used strategies were also most accessible.

The following table provides a breakdown of the strategies according to frequency and quality of use, based on the entire population in December 1975. Too few symbol users were using strategies in December 1974 to find any patterns at that time.

Table 1

SYMBOL STRATEGIES - December 1975			Total Number - 114	
Strategy	E & G	F & P	Not Stated	Used by
Opposite	49%	27%	24%	76%
Combine	25	23	52	48
Tense	35	26	39	61
Exclamation	12	20	68	32
Big/Little	29	12	59	41
Part of speech indicator	21	32	47	53
Relativiser	6	10	84	16
Symbol part	7	11	76	18
Other	3	3	94	6

E = excellent
G = good

F = fair
P = poor

From Table 1 it is apparent that the strategies used most frequently (i.e. more than 50%) by the general population

are: *Opposite, Tense, Part of speech*. Those used moderately (i.e. 33%-50%) are: *Combine, Big-Little Meaning*. Those used rarely (i.e. less than 33%) are: *Exclamation, Symbol part, Relativizer*.

It would appear that there is confusion as to the definition of the *Big-Little Meaning* strategy as referred to in *Semantography* (p. 367). This is an advanced strategy and thought to be used by few, if any, symbol users. That 41% of the population were rated as to their performance on this strategy led the investigators to suspect that the meaning of this strategy was unclear. A random survey of symbol instructors produced four different meanings for this strategy, none of which was the intended meaning. Consequently, the findings with regard to the *Big-Little Meaning* strategy are considered to be unreliable.

COMBINE STRATEGY:

Table 2

CHILD'S ABILITY TO CREATE NEW SYMBOLS

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
No interest in creating symbols	91	58	30	26
Contributes to creating symbols but highly dependent	38	24	33	29
Attempts to create new symbols but needs assistance to complete	10	6	18	16
Independently creates new symbols; poor quality	5	3	9	8
Independently creates new symbols; requires minimal assistance for symbol to be accepted	6	4	10	9
Independently creates acceptable symbols	6	4	10	9
Independently creates exceptional symbols	<u>1</u>	1	<u>4</u>	3
Total	157		114	

The strategy of *combine*, which allows for the creation of new symbols, is worthy of special attention. Table 2 provides an indication of the general population's interest and ability to create new symbols in December 1974 compared with December 1975.

In general the children's interests and abilities to create new symbols increased over the one year period. The large number showing no interest in creating new symbols in December 1974 either could have improved or could have been among the discontinued subjects of the study. In all other categories, the number of children increased from December 1974 to December 1975. Even at the highest level, 5% of the total population were independently creating either acceptable or exceptional symbols in December 1974, as compared with 12% in December 1975.

The results considering the child's *ability to create new symbols* were also analysed according to Age and I.Q. subgroup breakdowns for December 1974 and December 1975 (see Appendix 4(c), Table 6). The results indicate that for both 1974 and 1975 the effects of Age and I.Q. on the child's *ability to create new symbols* are statistically significant. That is to say, a young retarded child would likely have less interest in creating new symbols; whereas, a non-retarded 16 year old is more likely to be independently creating acceptable or exceptional symbols.

As explained in the Blissymbol System section of the Handbook (p. 19) rules have been formulated for creating new symbols. One guideline is that classifiers are positioned first with modifiers following sequentially.

The interviews conducted in the Spring of 1975 and again in December 1975 queried the instructors of the sub-population as to whether the rule of "classifier first" was workable with their particular children.

There were about as many instructors interviewed in the Spring of 1975 who felt that the rule classifier first was workable for their children in creating new symbols, as there were instructors who stated that this was not a workable rule. Some were undecided and had qualifying situations as to when it was applicable and when it was not. What follows is a summary of the reasons leading to their conclusions.

Merits of using "classifier first"

- (a) Classifier helps the listener clue in and interpret meaning;
- (b) Assists with teaching of concepts;
- (c) Children learn from model teacher sets;
- (d) Follows French language structure;
- (e) Standardization.

Problems with using "classifier first"

- (a) Not natural, but children can learn it by rote;
- (b) More logical to follow English word order;
- (c) Equipment - users give as first symbol, the one appearing first in scanning;
- (d) Difficult concept for young or low functioning child to understand;
- (e) Confusing, as visual system does not parallel auditory input of English phrase.

In December 1975, when the instructors were interviewed again as to whether there were any changes in their opinions about the rule of "classifier first", in general more were using the rule as a model for the children to follow. However, what was being accepted from the child ranged from allowing the child to choose what he would use, to encouraging him to use the rule, to insisting that he use the rule.

For the most part, the instructors were trying to teach the rule by using it as a model but were accepting what the child produced and not insisting on the classifier first. Some continued to feel that it was too much to expect from their lower functioning children. Many working with younger children had still not introduced the concept. Some felt that it was useful to have a rule; others felt it was useful to the listener but not to the symbol user.

As well as interviewing instructors regarding their opinions of the rule, an analysis was made of the newly created symbols submitted with reference to the rule for March 1975 and for December 1975. First the submissions were grouped according to whether they were representing single words, compound words or pictographs. Then the single and compound words were coded as to whether the classifier or modifiers appeared first. In considering the compound words it became apparent that many of the created symbols fell into another category - that of direct translation from English.

Table 3

USE OF COMBINE STRATEGY

Description	March 1975		December 1975	
	No.	%	No.	%
Single Words	75	76	94	80
Compound or double words	18	18	23	20
Pictographs	<u>5</u>	<u>6</u>	<u>0</u>	<u>0</u>
Total	98	100	117	100
Single Words - Classifier	51	68	53	56
- Modifier	<u>24</u>	<u>32</u>	<u>41</u>	<u>44</u>
Total	75	100	94	100
Compound or Double Words				
- Classifier	6	33 1/3	5	21
- Modifier	3	16 2/3	3	13
- Direct Translation	<u>9</u>	<u>50</u>	<u>15</u>	<u>65</u>
Total	18	100	23	100

The opinions expressed by the instructors as to whether the rule of "classifier first" was workable was reflected in the analysis of newly-created symbols for single words. From Table 3 it is shown that while more than half the single-word symbols submitted had the classifier appearing first in both March and December, there was a decrease of single words where the classifier came first from 68% in March to 56% in December.

An interesting finding emerges in looking at the compound words. Fifty per cent of the examples in March and 65% in December followed a direct translation of English in creating compound words, such as "fire truck", "water safety". It seems that the first word or component was being considered as an adjective modifying the second part, and hence follows English order.

In reacting to the use of direct translation as the pattern commonly employed to create new symbols for double or compound words, the recommendation came forth for formalizing a new strategy which would signal the creation of a new symbol according to direct translation, as distinct from the *Combine* strategy where the classifier is first. It was thought that two distinct and separate strategies with their own unique and individualized rules would make for quicker, unambiguous interpretation on the part of the listener.

At the May Evaluation Workshop, participants were asked to address themselves to the following questions as they pertain to specific Age/I.Q. sub-groups:

1. When creating new symbols, do they
 - (a) Use pictographs?
 - (b) Use the rule "classifier first" for single words?
 - (c) Use the rule "classifier first" for double or compound words?
 - (d) Use *Combine* strategy when doing a direct translation of double words, or do they see it as two separate words with no indicator?

2. When teaching, not creating, has it been difficult for the children to learn symbols which fall into the category of direct translation, such as workman, workbook, black-board?
3. Discuss their reaction to introducing a new strategy to mean direct translation.

0-5 Non-retarded Sub-group:

Instructors indicated that with this sub-group they did not attempt to teach the rule of "classifier first" for either single or compound words. Young children tended to follow the order of English phrases and, while some instructors provided the model with the classifier first, the order they expected and accepted from the children paralleled the language which the children heard. This group was satisfied to use *Combine* indicator as a signal that a new symbol was being created, without having a new strategy to distinguish two styles of creating.

6-12 Non-retarded Sub-group:

The majority of this group did not use pictographs for creating new symbols; however, those that do, found them a useful and effective way to expand the system. It was emphasized that a distinction should be made between the functional use of pictographs which could not be classified as Blissymbols but could be functional in a specific setting, and the inappropriateness of printing such pictographs for general circulation. If pictographs are used within a specific setting they should be distinguished from the Blissymbols in some way, e.g. a different colour or outline.

There were strong differences of opinion regarding the use of the rule "classifier first". Some strongly wanted to follow English word order and "parallel the language of the environment"; whereas others found the classifier first to be desirable and of assistance to the listener.

The compromise position which emerged was to show the model of classifier first in teaching and in publications, but to accept modifier first in communication from the child. This group did not see a need to introduce a new strategy to indicate direct translation. The recommendation was simply to do it without any signal.

12+ Non-retarded Sub-group:

This group did not use pictographs. For this population, putting the classifier first was a desirable objective. The instructors would accept modifiers coming first in creating new symbols, during a discussion, but they felt it important to teach the rule in order to preserve the standardization of the system. As with those discussing the 6-12 Non-retarded population, this group felt that *Combine* indicator should be reserved for creating new symbols using the rule, and that for created symbols using direct translation the first word be considered as an adjective modifying the second component. This eliminates the need for a new strategy. This group found no difficulty in teaching compound words using the rule of classifier first. It does not upset the children receptively, however, the children had difficulty using the model expressively.

0-5 Retarded

Much of this discussion was not relevant to this group. Most are not involved in the creation of new symbols. The children would be exposed to the model only through the instructor's examples or publications. Most instructors felt that following English order would be most appropriate for this group and that to demand the classifier first would be too taxing.

In summary, one general conclusion emerging from these discussion groups appears to be that providing the model of classifier first is desirable; however, expectations for the child's use of the model would vary according to age and I.Q. level. Most instructors do not encourage the creation

of pictographs; however, on the occasions when they are created, they should be restricted to a functional use in a particular setting and should not be considered part of the Blissymbol System. While some will continue to use direct translation for creating compound symbols, there did not appear to be the need to standardize a new strategy; rather, the first component should be considered as an adjective modifying the second with no special signal necessary.

OTHER STRATEGIES:

Range of Meaning Strategy:

This strategy was recommended for use by the child to indicate that he wanted an expanded meaning of the symbol beyond the printed word which accompanied the symbol. This would be used by the child when the listener was perseverating over the word accompanying the symbol, and not giving a meaning beyond that specific word.

The group discussing its application for the 0-5 Non-retarded population thought it was a useful strategy, not only for the listener, but also for teaching the child in a concrete way the concept that one symbol has a range of meanings. This new strategy was not considered to be necessary for the 12+ Non-retarded group as it was generally felt that they could convey this message in another way such as spelling. This group also cautioned against introducing too many strategies as they could only be used with a limited number of people, unless a glossary of strategies accompanied the child making it possible for the unfamiliar person to understand them. Those concerned with the 0-5 Retarded group liked the concept of this strategy but wanted the symbol to convey the meaning of "another" or "different word" rather than "range of meaning".

In summary, generally the concept of this strategy was considered to be useful except for the older Non-retarded group who were capable of expressing this idea in a different way.

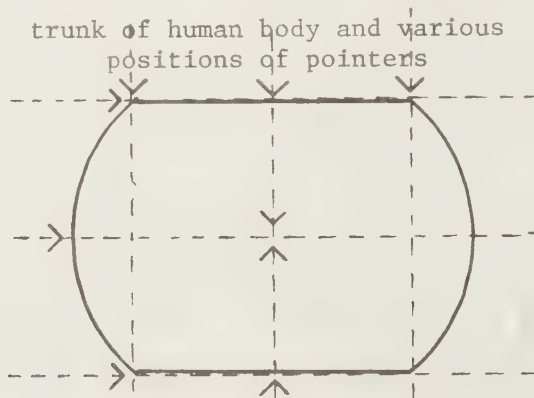
Colour:

Both C.K. Bliss and the Blissymbolics Communication Foundation make use of numbers to indicate colour. The basic difference is that Bliss follows the colours of the spectrum so that similar colours follow sequentially (Semantography, p.286); whereas, BCF's arrangement alternates dark and light colours.

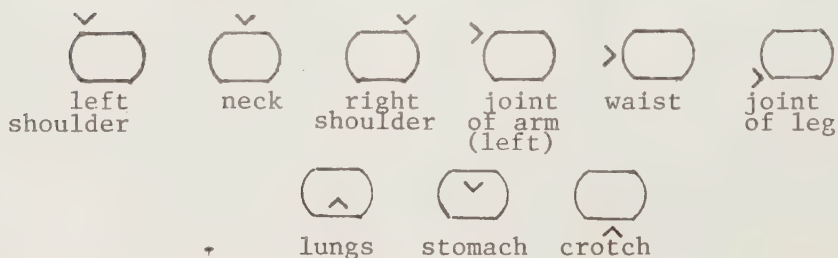
None of the groups, regardless of Age or I.Q. level, felt that the Semantography version for colour was desirable. All felt it was too sophisticated for children and that, particularly for young children who may be experiencing difficulty discriminating colours, the BCF arrangement was less confusing and easier to learn.

Body Parts:

C.K. Bliss has designed a way of indicating specific body parts.



additional pointers in other positions can be used to indicate other parts of the human body.



All instructors reacted favourably to this way of extending the number of body parts available to the symbol-user. They felt this should be available as supplementary vocabulary rather than as part of the core vocabulary.

COMPARISON OF RETARDED AND NON-RETARDED
IN SYMBOL USAGE:

The use of strategies for the retarded population was compared with their use by the non-retarded group (see Table 4). There was greater response to all the symbol strategies being used by the non-retarded population than by the retarded population, except for the strategies *Big-Little Meaning*, *Relativizer* and *Symbol Part*. The general confusion regarding the *Big-Little Meaning* strategy has been explained earlier. *Relativizer* and *Symbol Part* were used with equal infrequency for both populations.

Table 4

SYMBOL STRATEGIES: COMPARISON OF NON-RETARDED AND RETARDED SUB-GROUPS

Description		Non-retarded		Retarded		%
		N	%	N	%	Difference
Opposite	E	11	24%	5	8%	16
	G	20	43	18	28	15
	F	5	11	14	22	11
	P	4	9	7	11	2
	Not answered	6	13	21	32	19
Combine	E	10	22%	1	2%	20
	G	7	15	9	14	1
	F	8	17	5	8	9
	P	6	13	7	11	2
	Not answered	15	33	43	66	33
Tense	E	7	15%	1	2%	13
	G	12	26	20	31	5
	F	5	11	7	11	-
	P	8	17	9	14	13
	Not answered	14	30	28	43	13
Exclamation Mark	E	2	4%	1	2%	2
	G	4	9	6	9	-
	F	5	11	6	9	2
	P	8	17	3	5	12
	Not answered	27	59	49	75	16
Big & Little Meaning	E	5	11%	10	15%	4
	G	5	11	12	18	7
	F	5	11	4	6	5
	P	3	7	1	2	5
	Not answered	28	61	38	58	3
Part of speech indicator	E	1	2%	2	3%	1
	G	10	22	10	15	7
	F	12	26	11	17	9
	P	6	13	8	12	1
	Not answered	17	37	34	52	15
Relativizer	E	1	2%	1	2%	-
	G	2	4	3	5	1
	F	2	4	5	8	3
	P	1	2	4	6	4
	Not answered	40	87	52	80	7
Symbol Part	E	1	2%	-	-	2
	G	4	9	3	5	4
	F	5	11	5	8	3
	P	3	7	6	9	2
	Not answered	33	72	51	78	6
Other		96%		94%		
		No		No		
		Answer		Answer		
Number						
Answering		46		65		
Questions						

In Table 5, the three most commonly used strategies are compared for the Non-retarded and Retarded sub-groups. *Opposite*, *Combine* and *Tense* are used by over 68% of the Non-retarded population at one of the four proficiency levels.

Table 5

SYMBOL STRATEGIES (OPPOSITE, COMBINE, TENSE): COMPARISON OF NON-RETARDED AND RETARDED SUB-GROUPS

	Non-retarded		Retarded	
	N	%	N	%
<u>Opposite</u>				
excellent, good	31	67%	23	36%
fair	5	11	14	22
poor	4	9	7	11
not used	6	13	21	32
<u>Combine</u>				
excellent, good	17	37%	10	16%
fair	8	17	5	8
poor	6	13	7	11
not used	15	33	43	66
<u>Tense</u>				
excellent, good	19	41%	21	33%
fair	5	11	7	11
poor	8	17	9	14
Number Answering Questions	46		65	

The percentage of the population recorded as Excellent and Good was higher in the Non-retarded population than in the Retarded. Also the percentage not using these strategies at all was consistently greater in the Retarded population than in the Non-retarded.

With regard to the other strategies - *Exclamation Mark*, *Big-Little Meaning*, *Part of Speech*, *Relativizer*, *Symbol Part* - the numbers recorded within both populations as using them as either Excellent or Good were too small for comparison figures to be useful.

The differences between Non-retarded and Retarded use of symbol strategies are not always striking; nevertheless there is a general trend toward higher frequency of use and

toward a higher level usage of the three most generally used strategies within the Non-retarded sub-group as compared with their usage in the Retarded sub-group as defined in this study.

In Table 6, the most commonly used non-symbol strategies are compared for the Non-retarded and Retarded sub-groups. A lower level of usage by the Retarded was reported for all categories. The percentage not using these strategies was also greater in the Retarded population, except for gestures, where both groups were comparable.

Table 6

NON-SYMBOL STRATEGIES

			Non-retarded		Retarded	
			N	%	N	%
Alphabet -	E & G		24	52	14	21
initial consonant						
1.	F		8	17	13	20
	P		4	9	7	11
Not used			10	22	31	48
Alphabet -	E & G		6	13	-	-
endings						
2.	F		4	9	1	2
	P		2	4	2	3
Not used			34	74	62	95
Spelling	E & G		9	20	4	7
3.	F		9	20	4	6
	P		10	22	7	11
Not used			18	39	50	77
Gestures -	E & G		31	67	34	52
content						
4.	F		4	9	11	17
	P		1	2	6	9
Not used			10	22	14	22

In Table 7, relating to categories, the same pattern of usage is shown by both the Retarded and Non-retarded populations; however, with the Retarded, the usage is generally less. The area showing the greatest difference (19%) is that of "Questions". It is interesting to note that this category relies on initiation by the user.

Table 7

USE OF CATEGORIES WITHIN SYMBOLS

	Non-retarded		Retarded	
	N	%	N	%
1. Yes/No	45	94	61	88
2. Manners	42	87	54	78
3. Questions	39	81	43	62
4. People	47	98	62	61
5. Actions	46	96	62	90
6. Emotions	46	96	61	88
7. Descriptive words	43	90	62	90
8. Things	47	98	61	88
Total Number	48		69	

With reference to the number of *Types of statements* (Table 8), a large proportion of the Retarded population (72%) lies in the range from 1 to 3; whereas with the Non-retarded population, a more even division occurs with 54% utilizing 1 to 3 types of statements and 45% utilizing 4 to 6 types of statements.

Table 8

NUMBER OF TYPES OF STATEMENTS

Number of Types of Statements	Non-retarded		Retarded	
	N	%	N	%
1 - 3	18	54	36	72
4 - 6	15	45	14	28
No Answer	30		41	
Total N Responding	33		50	

Statement Types
Statement
Negative Statement
Question
Negative Question
Command
Negative Command

3. REPORT REGARDING SYNTAX OF SYMBOL UTTERANCES

Because of the functional semantic perspective with which most of the instructors viewed syntax (see Syntax section of Handbook, p. 32), it seemed appropriate to examine the symbol utterances submitted during the study with regard to the meaning conveyed. The categories by which the symbol utterances were coded and organized were derived from the early semantic grammatical (SG) rules as presented within the Environmental Language Intervention Strategy (ELIS) (MacDonald and Blott, 1974) and from strategies and constructions within Blissymbolics.

It must be mentioned that in using the ELIS presentation of the early SG language rules as the basis for the coding categories for symbol utterances, liberty has been taken with their application as developed by MacDonald and Blott. Within ELIS, the SG early language rules derived from the semantically based approach to grammar of Bloom, Schlesinger and Brown, are placed in a clinical design directed toward diagnosis and training. In the Evaluation Study they have been utilized as a starting reference for the organization of symbol utterances. It should not be inferred, because the early language rules were referenced, that early symbol utterances were being considered as paralleling early speech or that the symbol utterances were limited to two-symbol constructions (see results which follow for the range of utterance lengths and the additional categories required). Particularly within the population sample selected, the range of receptive language capabilities differed greatly from that which would occur with early language users. (See DESCRIPTION OF POPULATION SAMPLE SELECTED, page 57, for age, grade level, etc.). A further limitation in the use of the early grammatical rules was recognized: reliance solely on the instructor's translation to obtain the semantic component of the utterance, restricted the value of the information obtained. It was felt, however, that in spite of the gross differences between the early speaker and the early symbol user, and the limited information with respect to the environment of utterances, the ELIS SG

rules, with the addition of other SG categories and Blissymbolic constructions, provided a framework for an initial examination of symbol utterances with reference to semantic intent.

DESCRIPTION OF POPULATION SAMPLE SELECTED:

In order to arrive at a manageable number of utterances for analysis, a sample population was selected from the total population. This sample consisted of all symbol users in the grade levels (at time of symbol introduction) of Kindergarten, Primary, Grade 1, Grade 3 and Advanced Elementary, within the non-retarded symbol-using population, who had begun symbol instruction prior to September 1974. Their number totalled 43, 47% of the total experienced, symbol-using population (which numbered 92 and composed 59% of the total population). They included students from all symbol classes and students who were the only symbol users in their classrooms. They resided in both institutional and home settings and were educated in a range of setting types. Their instructors numbered 25.

The age range of the sub-population students was from 5 to 29 years with the average age of 11 years.

Score Ranges in Skill in Symbols and Reading Score were:

SKILL IN SYMBOLS (see Appendix 1, p. 110)

1974 range:	3 to 79
1975 range:	17 to 99
Change in SKILL IN SYMBOLS range:	-38 to +39
Mean Change:	8.9

READING SCORE (see Appendix 1, p. 109)

1974 range:	9 to 79
1975 range:	18 to 78
Change in READING SCORE range:	-21 to +21
Mean change:	2.29

The students' means of accessing the symbols were:

Electronic equipment not required (pointed to symbols)	25
Had electronic equipment	3
Required electronic equipment but unavailable	7
Required improved electronic equipment	1
Other means used (e.g. eye pointing)	4
Not stated	<u>3</u>
Total	43

The Types of Statements¹ of which the students were capable:

December 1974

<u>No. of Statement Types</u>	<u>Number of Students</u>
1	12
2	10
3	8
4	5
5	3
Not Stated	<u>5</u>
	43

Of the sample students, during the period December 1974 to December 1975, 8 increased in the number of statement types of which they were capable; 5 decreased.

From this population sample the *typical* and *best* symbol utterance² for December 1974 and December 1975 were selected for examination. The total number of utterances, submitted by the instructors in a form which could be coded, was 108 (of a possible 172). Examples of symbol statement categories appear in Appendix 7.

¹Types of statements refers to statement, question, command, negative statement, negative question.

²(i) *Typical* and *best* symbol utterances - as evaluated by students' instructors (see Syntax section in Handbook, p. 47).

(ii) An utterance can be composed of one or more principal clauses, each of which is equivalent to a statement.

The number of symbols in the coded utterances:

Number of symbols in BEST Utterance

1974 Range:	1-17	Mean:	6	No. of Utterances:	34
1975 Range:	2-17	Mean:	9	No. of Utterances:	20
Change from 1974 to 1975, Range:		-4 to +11			
		Mean:	+1.6		

Number of Symbols in TYPICAL Utterance

1974 Range:	1-11	Mean:	4	No. of Utterances:	34
1975 Range:	1-15	Mean:	5	No. of Utterances:	<u>20</u>
Change from 1974 to 1975, Range:		-4 to +11			
		Mean:	1		
				Total Utterances:	108

Each statement was coded according to the semantic grammatical rule category which represented the total statement. In the case of compound sentence utterances, each principal clause was coded separately. The total number of principal clauses (statements) to be coded was 115¹. The order in which the symbols appeared within the statements was not considered in the coding.

Table 1 presents the number of statements for each semantic grammatical rule category. In tallying the incidence of each grammatical rule category, only the code assigned to the total statement was considered. Table 2 presents a summary of the 108 utterances coded according to sentence type, parts of speech, time reference, descriptives, symbol and non-symbol strategies, tense indicators and plurals.

¹Within the 108 coded utterances, the number of conjunctions which joined principal clauses (included or inferred) totalled 7. As each clause was coded separately it will be noted that there is a discrepancy between the number of utterances and the number of statements coded.

Table 1

SEMANTIC GRAMMATICAL RULES

Categories		Number of Statements	
		Best	Typical
x *	1. Agent + Action	1	2
*	2. Action + Object	3	2
x	3. Agent + Action + Object	10	15
*	4. Agent + Object	2	1
* +	5. Entity + Locative (place to which, from which, in which)	2	3
* +	6. Action + Locative	-	2
x +	7. Agent + Action + Locative	12	6
+	8. Agent + Locative	1	3
	9. Locative	1	-
x +	10. Agent + Action + Object + Locative	4	3
x +	11. Action + Object + Locative (Imperative)	1	-
x +	12. Agent + Action + Locative + Ablative (by what means or instrument it is done, accompaniment)	1	1
+	13. Agent + Locative + Ablative	1	1
x +	14. Agent + Action + Locative + Ablative + Dative	-	1
x	15. Agent + Action + Ablative	-	1
x	16. Agent + Action + Object + Ablative	-	1
* +	17. Entity + Dative (interest, purpose, doer, indirect object)	-	1
x +	18. Agent + Action + Dative	2	-
x +	19. Agent + Action + Object + Dative	6	1
+	20. Agent + Modifier + Object + Dative	1	-
x +	21. Agent + Action + Locative + Dative	2	1
+	22. Agent + Locative + Dative	-	1
+	23. Locative + Ablative	-	1
+	24. Agent + Modifier + Dative	-	1
	25. Object alone	1	4
	26. Modifier alone	-	1
x	27. Object + Intransitive Verb + Object or Modifier	1	1
x	28. Agent + Action + Clause (beginning if, that, all uses of relativizer)	2	2
	29. Agent + Modifier	-	1
x * ++	30. Negative Statement In the 3 examples,		
*	a) non-existence) the negative symbols	1	1
*	b) rejection) were positioned	-	-
*	c) denial) <u>before</u> the verb.	2	-
TOTAL		58	57

x Categories considered "more advanced". (see p. 62)

* Categories derived from ELIS

+ Coded as to whether the preposition was included or inferred

++ Coded as to whether negative positioned before or after verb

Table 2

BLISSYMBOLIC CONSTRUCTIONS

Categories	Number of Cases	
	In Best	In Typical
<u>Descriptives (included within a sentence)</u>		
(a) attribution	20	13
(b) possession ' included	-	-
' inferred	14	5
(c) recurrence	-	-
<u>Tense Indicators</u>		
Past - indicator included*	9	5
- indicator inferred	2	5
Present - indicator included*	5	1
- indicator inferred	1	
Future - indicator included*	2	
- indicator inferred	2	1
<u>Classification of statement</u>		
(a) at beginning of sentence	1	1
(b) at end of sentence	2	
<u>Time reference</u>	9	7
<u>Time reference within prepositional phrase</u>	2	2
<u>Plural</u>	1	3
<u>Symbol Strategies</u>		
Combine	7	3
Like	1	1
Opposite	2	2
<u>Non-Symbol Strategies</u>		
Gesture	1	2
Letter	10	4
Word	5	6
Use of articles (the, a)	5	3
Use of to (word)		1
to (symbol)	1	1
<u>Sentence Types</u>		
Compound - with conjunction	2	
- without conjunction	4	
Questions (The 4 sentences cited used Bliss order: question symbol followed by statement order.)	3	1
Imperative	1	1
<u>Parts of Speech</u>		
Secondary verbs, included	14	5
Secondary verbs, inferred	3	1
Conjunctions, included	5	4
Conjunctions, inferred	10	1
Prepositions, included	6	5

* In all cases cited, the tense indicator was positioned before verb.
(See discussion re syntax model, page 32, Handbook)

From the *best* statements, 1975 and 1974,¹ (numbering 36) two groups of statements were selected for a comparison. The division into two groups of statements was primarily based on the inclusion/exclusion of both the agent and action symbol.

Group A was comprised of statements designated as more advanced, such as the following statement types:

Agent + Action
 Agent + Action + Object
 Agent + Action + Locative
 Agent + Action + Object + Locative
 Agent + Action + Locative + Ablative + Dative
 Agent + Action + Ablative
 Agent + Action + Object + Ablative
 Agent + Action + Dative
 Agent + Action + Object + Dative
 Agent + Action + Locative + Dative
 Object + Intransitive verb + Object or Modifier
 Agent + Action + Clause
 Action + Object + Locative
 Agent + Action + Locative + Ablative
 Negative Statement

The total number recorded was 31.

Group B comprised statements considered less advanced (i.e. lacking an agent and/or an action symbol). The only statement types which could be included and for which there were examples were:

Agent + Object
 Locative
 Agent + Object
 Agent + Locative + Ablative

The total number recorded was 5.

The statements of Group A and Group B were compared with regard to the inclusion of Blissymbolic constructions, sentence types and parts of speech; the symbol users who produced the statements were compared according to age, grade level, number of symbols available and performance with symbols.

¹Where possible, the subject's 1975 *best* statement was examined for the comparative study. When the 1975 statement was not recorded, the subject's 1974 *best* statement was taken.

The total number of *best* statements utilized in the comparison was 36. These were derived from the utterances of 34 persons for whom *best* statements were recorded.

Interesting comparisons can be made between the students whose statements were included in Group A and those whose statements were included in Group B.

Group A students numbered 29 and were spread over all age and grade levels (with heavier concentration at Kindergarten, Primary and Grade One levels). Their symbol displays contained 100 or more symbols except for one student and the number of statement types recorded for them was evenly distributed over the range from 1 to 5. Their mean score for SYMSKILL was 45 and their change in SYMSKILL between December 1974 and December 1975 averaged 13. The range in number of symbols in their best sentences was 2 to 21 with a mean of 9. The following figures demonstrate Group A's use of Blissymbolic Constructions, sentence types, parts of speech:

(1) Blissymbolic Constructions:

negative	3
descriptive	32
tense indicators	15
time reference	11
plural	5
gestures	2
letters	8
words	9
<u>like</u> strategy	2
<u>opposite</u> strategy	3
<u>combine</u> strategy	7

(2) Sentence Types:

compound	2
questions	3
imperative	2

(3) Parts of Speech:

prepositions	2
conjunctions	6
articles	6
secondary verbs	14

The Group B students numbered 5. All were below 11 years of age and below the grade one level. The symbol displays contained 100 symbols or less and the number of statement types of which they were capable was 1 or 2. Their mean score for SYMSKILL was 22 and their change in SYMSKILL between December 1974 and December 1975 averaged 13. The range in number of symbols in their *best* sentences was 2 to 4 symbols with a mean of 3. Their total use of (a) the Blissymbolic Constructions, (b) the sentence types of compound, questions and imperative, and (c) the parts of speech of secondary verbs, conjunctions and prepositions, was limited to 3 instances:

descriptive	1 case
conjunction	1 case
time reference	1 case

The preceding comparison between Group A and Group B, although very gross, suggests that a growing complexity of sentence construction is paralleled by an increase in use of Blissymbolic Constructions, number of sentence types and number of parts of speech.

It is also interesting to note that upon initial examination the length of symbol utterance could be taken as an indicator of the complexity of symbol utterance. In the Group A statements, the mean length of utterance (MLU) was 9; in the Group B symbol statements, the MLU was 3. A relationship between length of utterance and complexity of sentence construction could also be inferred from the quantitative analysis of data. From the regression analysis, *Number of symbols in best sentence* and *Number of symbols in typical sentence* were identified as

variables closely related with SYMSKILL. From the analysis of variance, the effect of both Age and I.Q. upon those two variables was demonstrated, leading one to associate length of utterance with degree of symbol skill. It was also shown through the t-test for related samples (see Appendix 5), that these two variables showed a change which can be inferred as relating to the symbol instructional program.

A note of caution must be made, however, with regard to utilizing the length of symbol utterance as an evaluation measure. Not all symbol users are physically able to produce long utterances. At this stage of symbol usage, particularly with reference to the severely physically handicapped population, the MLU could be quite misleading. For them, a brief statement which communicates their meaning would be more effective and would represent greater knowledge and skill than a longer utterance. Their need for the development of a concise yet advanced form of symbol output makes it imperative that criteria other than MLU be considered in assessing effectiveness of symbol utterances.

There is an urgent need for categories and terminology to describe different styles of symbol output and for controlled studies to compare the symbol usage of different populations. It is hoped that this preliminary examination of symbol utterances will stimulate the development and refinement of means for analyzing and evaluating symbol utterances and will serve as motivation for further research. The value to be derived from refining a syntax appropriate to this totally visual medium makes this an important area for attention.

B. Factors Affecting Blissymbol Communication

1. A STUDY OF THE POPULATION WITH REFERENCE TO THE RELATIONSHIP BETWEEN SYMSKILL AND ASSESSMENT-RELATED VARIABLES

In addition to describing the total population on those variables which are part of the initial assessment (Appendix 3), specific groups of the population were studied with regard to their functioning on the assessment-related variables. Four groups were arrived at, based on initial SYMSKILL score in December 1974 coupled with amount of change in the SYMSKILL score from December 1974 to December 1975. The cut-off points in SYMSKILL and in change of SYMSKILL were chosen to include approximately 20% of the population. The criteria were as follows:

- for Initial SYMSKILL score:

Low SYMSKILL included subjects scoring
20 points or less

High SYMSKILL included subjects scoring
44 points or more

- for Change in SYMSKILL:

Low amount of change was defined as
2 points or less

High amount of change was defined as
30 points or more

The crossing of these two selection criteria produced four groups with either Low or High score and Low or High change. The actual number of subjects for these groups was considerably smaller than 1/5 of the population. These four groups are identified as follows:

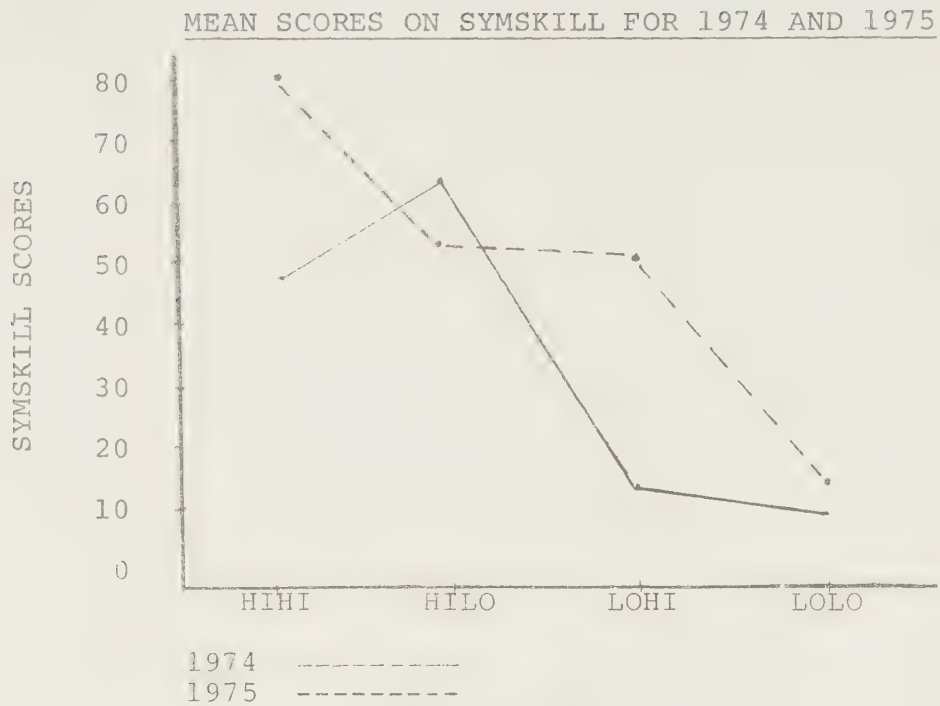
Table 1

SYMSKILL

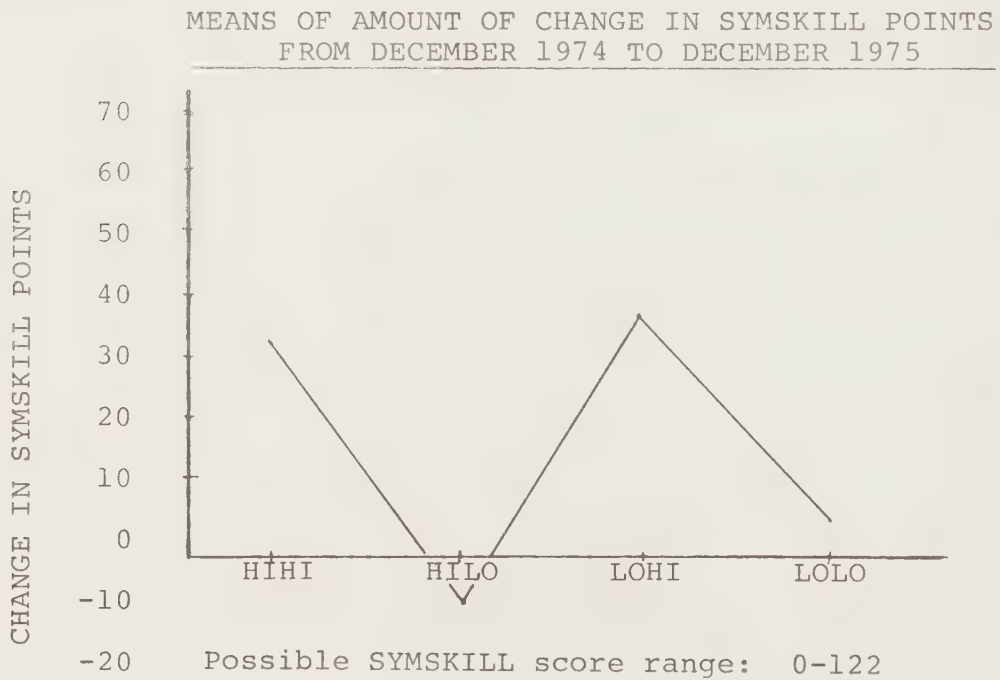
Name	Description	Number in Group
HIHI	High SYMSKILL score 1974 large amount of change	1
HILO	High SYMSKILL score 1974 small amount of change	10
LOHI	Low SYMSKILL score 1974 large amount of change	6
LOLO	Low SYMSKILL score 1974 small amount of change	4

VI RESEARCH DATA

Graph 1



Graph 2

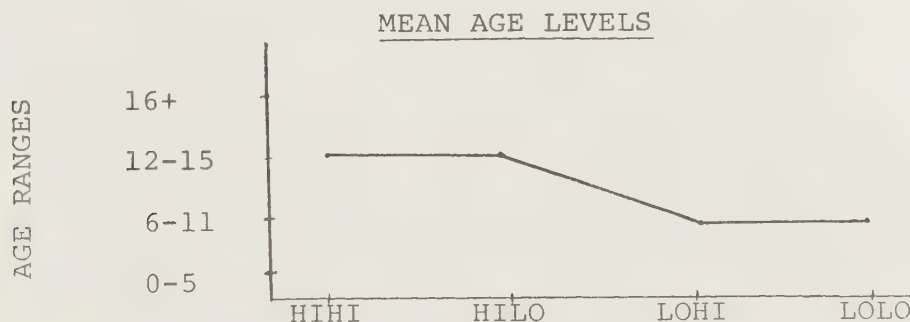


The mean or average scores of the groups were considered for descriptive variables in December 1974 and variables relevant to the initial assessment in December 1974, in order to make a comparison among the groups on the basis of initial skill with the symbol system and progress after one year.

DESCRIPTIVE VARIABLES:

For the descriptive variables of Age, I.Q., Experience and Disability levels, the mean scores for the HIHI and HILO groups were the same and the means for the LOLO and LOHI groups were the same. Differences did occur between the two HI groups and the two LO groups, but these were related to differences in initial SYMSKILL score, not to the amount of progress after one year. The means of those beginning with a high SYMSKILL score, regardless of the amount of change to follow in the next year, were in the 12-15 age range, the non-retarded intellectual range, the experienced symbol-user group, and at the level of moderate physical disability. On the other hand, the means for those with an initial low SYMSKILL score, regardless of the change score were in the 6-11 age range, the retarded range, the inexperienced symbol-user group and the level of severe physical disability. The Age variable was chosen as a representative example of this group; its mean scores are given in Graph 3.

Graph 3



Some of the variables related to initial assessment showed no outstanding differences across the four groups. Table 2 presents these variables along with their corresponding means.

Table 2

VARIABLE	MEAN
<i>Assessed language comprehension</i>	Grossly below to 1-2 years below
<i>Observed language comprehension</i>	Grossly below to 1-2 years below
<i>Speech prognosis</i>	Poor
<i>Substitute/complement</i>	Substitute
<i>Highest visual level</i>	Pictures by function
<i>Child's frustration</i>	Moderate
<i>Hearing diagnosis</i>	Normal

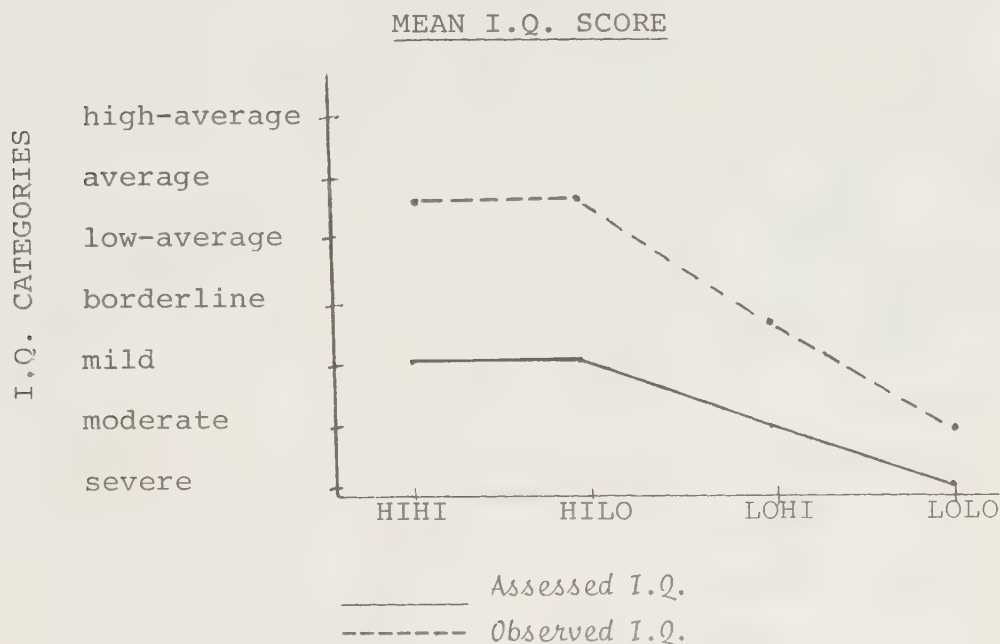
ASSESSMENT-RELATED VARIABLES:

The following are assessment-related variables where differences in the mean scores for the groups were apparent:

Interest in communication
Ability to deal with listeners misunderstanding
Speed of learning symbol
Interest in creating new symbols
Attitude toward learning new symbols
Reading score
I.Q. - Assessed and Observed
Alertness
Visual problems
Picture size
Number of symbols related to
Auditory attention
Ability to learn auditorily

The I.Q. variable was chosen as a representative example of this group of variables. Its mean scores for *Assessed* and *Observed I.Q.'s* are plotted in Graph 4.

Graph 4



The general trend appearing is that the mean scores for HIHI and HILO groups are usually similar, and typically at the high end of the rating scale for a particular variable. While the scores on the assessment variables reflect differences between the two LO groups and the two HI groups with regard to initial SYMSKILL scores, they are not useful in distinguishing those in the HI group who have a high degree of change from those in the HI group where amount of progress is small.

Generally, the difference between the mean scores of variables for the LOLO group and LOHI group is greater than the difference between those for the two HI groups. Typically the LOLO mean is lower and near the bottom end of the rating scale. The mean score for LOHI group generally falls between the LOLO mean and the means for the two HI groups.

The patterns presented for the means scores on *Visual attention*, *Auditory attention* and *Ability to learn through the auditory channel* deviated from this general pattern. On all three variables the means for LOHI group were as high as or higher than the means for the two HI groups. The good ability to attend both visually and auditorily no doubt contributed to the HI change score in SYMSKILL, even though they began with low SYMSKILL scores.

The statements which can be made with reference to this analysis are suggestive. Further more controlled study of these patterns would need to be undertaken before any definite statements could be made.

2. FACTORS AFFECTING LIMITED ACHIEVEMENT

From the December 1975 interviews and questionnaires, the following reasons were given for why some children should not have been started on a symbol programme.

- (a) Lack of interest in communicating;
- (b) Inability to understand process of communicating through an alternative medium;
- (c) Not ready developmentally - poorly assessed;
- (d) Communication with speech as effective as communication with symbols - due to physical limitations child could not gain access to large enough number of symbols;
- (e) Speech improved to the extent that symbols were no longer needed;
- (f) Lack of family support and co-operation;
- (g) Severe behaviour and emotional problems;
- (h) Mental level of functioning too low;
- (i) Extensive physical problems;
- (j) Functioning above the readiness level;
- (k) The only child in the setting;
- (l) The appearance of dyslexic symptoms;

- (m) Deteriorating vision;
- (n) A deaf child learning reading, typing, math and total communication - the child was overloaded by too many systems being taught simultaneously.

In order to supplement the information from the instructors as to the inappropriateness of symbols for some children, the case studies of those 22 symbol users having regressed SYMSKILL scores* were reviewed in order to identify common and recurrent factors which were associated with the regressed SYMSKILL scores. Not all children in the study described by these variables regressed in SYMSKILL; nevertheless, these variables described those symbol users who did regress. The following is a summary of the analysis of the common factors:

Table 1

COMMON FACTORS IN SYMSKILL REGRESSION

Description	Number
Symbols used as a complement to speech and/or with mobile child	5
Change in instructor (recorder) and/or residence	6
Requires electronic equipment and/or seating	6
No regular instructional program in chronic care setting	3
Extremely poor ability to attend	1
Highest level of visual materials child relates to is concrete objects (1974-75)	1
Total	22

* (a change of - to +6 points in SYMSKILL score from December 1974 to December 1975).

Along with Table 1, one or more of the following was reported as well:

Table 2

ADDITIONAL FACTORS IN SYMSKILL REGRESSION

Description	Number
Bilingual (second language not translated on symbol board)	3
Emotional difficulties - depression	4
Observed I.Q. moderately retarded	3
Visual problems:	
(a) acuity (c) focusing	
(b) perceptual (d) limited visual field	5
Institutional residence	8
Infrequent use of symbols at home due to:	
(a) lack of acceptance	
(b) speech better understood than symbols	
(c) child refuses to use symbols	7

In looking at Table 1, a distinction can be made between those factors related to the child's abilities and those over which others have control.

CHILD RELATED:

Factor

Complement and/or mobile	5
Poor ability to attend	1
Highest level visual materials	<u>1</u>

Total 7

DEPENDENT ON OTHERS:

Factor

Change in instructor and/or setting	6
Equipment and/or seating	6
Irregular programme	<u>3</u>

Total 15

Of the 22 children who had regressed SYMSKILL scores, over twice as many were described by factors dependent on others, compared with those described by factors relating to the child.

This discussion as to the suitability of symbol use is with specific reference to the physically handicapped child with communication difficulties.

During the course of the study, populations other than the physically handicapped, were identified for whom symbols could possibly help with their communication difficulties. These included: retarded (Vanderheiden, 1975); multiply-handicapped, autistic, aphasic, adult stroke patients (Hughes, 1976), people with auditory perception difficulties, stutterers (Singleton, 1976); those with delayed language development, deaf (Goddard, 1977). For some of these populations exploratory work is being conducted as to the feasibility of symbol use; however, to date there is little documentation available regarding these programs. Individualized assessment procedures need to be developed to ascertain the suitability of symbols for these different populations. Many of the factors outlined in the assessment for the physically handicapped lacking functional speech might be considered; however, the emphasis on specific factors could be different. As well, there are likely additional factors to consider, specific to each particular population. This is an area of future research and development.

C. Effects of Blissymbol Communication

1. READING AND READING ACTIVITIES

The Evaluation Study findings show that by December 1975, the last recording period of the study, 84% of the children in the pre-school kindergarten, and early primary population were using four or more play materials which provided symbol readiness.

Table 1

NUMBER OF PLAY MATERIALS (December 1975)

Description	Number	Percentage
2 toys	4	6
3 toys	6	10
4 toys	19	30
5 or more	34	54
Total	63	100

Only 40% of the materials incorporated symbols at a significant level. One would hypothesize that the limited incorporation of symbols into play materials resulted from lack of preparation time, for other information from instructors indicated a strong need for play materials containing symbols.

Table 2

INCORPORATION OF SYMBOLS INTO PLAY MATERIALS (December 1975)

Description	Number	Percentage
Minimal Incorporation of Symbols	38	60
*Significant Incorporation of Symbols	25	40
Total	63	100

*KEY

Incorporation of symbols into play materials was considered as significant if 5 or more points were accorded to play materials.

- (a) Symbols are not incorporated into play material; toy offers preparatory training. 1 Point
- (b) Toy has some reference to symbols. 2 Points
- (c) Symbols are totally incorporated into the play materials. 3 Points

Information from the Evaluation Study December 1975 recordings showed that 87% of the symbol users in the primary and above populations were using reading materials into which symbols had been integrated. For 57% of this population materials were "adapted often or totally".

Table 3

INTEGRATION OF SYMBOLS INTO READING MATERIALS (1975)

Description	Number	Percentage
Symbols <u>never</u> part of instructional reading materials	8	12
Symbols <u>occasionally</u> part of reading materials	20	30
Reading materials <u>often</u> are adapted to include symbols	14	21
Symbols are <u>totally</u> integrated into reading materials	24	36
Total	66	99

With regard to the reading approach, instructors were asked to identify their approach as one of: global (holistic-analytic; including language experience, sight vocabulary, whole phrase); atomistic (synthetic-decoding; including phonic, linguistic, alphabet-based, colour coding, new alphabet); eclectic (basal readers, programmed learning, reading labs, multi-media).

In March 1975 a survey of the reading materials being used by symbol instructors yielded reports of a wide number and range of reading programmes with no trend toward any of the three approaches. By December 1975, 37% of population were receiving reading instruction through a global approach and 31% through an atomistic approach. It is interesting to note that evaluations of the approaches in December 1975 give more positive ratings to the global approaches which emphasize visual skills and to eclectic approaches which allow flexibility on the part of the instructor.

Table 4

READING APPROACH USED (1975)

Description	Not Using		Using		Considering Approach Suitable*	
	#	%	#	%	#	%
Global	76	63%	44	37%	28	63%
Atomistic	83	69%	37	31%	7	19%
Eclectic	96	80%	24	20%	9	38%

(Population Reported on = 120)

*KEY

Excellent	4 Points	Reading approach was considered suitable if 4 or more points were allocated to it.
Good	3 Points	
Fair	2 Points	
Poor	1 Point	

One frequently expressed concern would appear not to be substantiated from the study findings. It is often felt that symbol instruction will interfere with a student's progress in reading as a result of the allocation of time toward symbol communication. The change in reading level scores during the Evaluation Study, would suggest that symbol instruction does not negatively affect reading performance even in the short term.

With regard to the implementation of the reading approach, little change occurred during the study. In both 1974 and 1975, the reading instruction was individualized for over 60% of the "grade one and over" population, with the remaining approaches being used roughly equally with 14-20% of the population.

Table 5

IMPLEMENTATION OF READING APPROACH

Description	Number	
	1974	1975
Individualized Instruction	46	46
Paired Instruction	15	14
Level Grouping	16	16
Non-Graded Grouping	11	11
Total Number Responding to this Question	76	65

For some subjects, more than one type of implementation was used; this occurred more frequently in 1975 than in 1974.

In 1974 the population was distributed into the following reading levels:

- 35% in pre-school and early kindergarten;
- 51% in early grade one (pre-primer);
- 7% in grade one (primer)
- 7% in grade two or higher.

By 1975 the remaining population was distributed as follows:

- 21% in pre-school and early kindergarten;
- 53% in early grade one;
- 13% in grade one;
- 9% in grade two or higher.

Table 6

READING SCORE (December 1974 and 1975)

Level	Score Range	Number		Percentage	
		1974	1975	1974	1975
Nursery	1-6	1	1	1	1
Pre-school	7-18	12	8	8	6
Early Kindergarten	19-30	36	16	26	14
Late Kindergarten/ Early Grade 1	31-42	45	34	31	29
Pre-Primer	43-54	29	33	20	24
Primer	55-66	12	14	7	13
Grade 2	67-78	6	6	5	6
Grade 3 and above	79-90	3	3	2	3
Total Number Responding		144	115	100%	96%

The 1974 and 1975 reading level scores and the description of change in reading score for the non-retarded and retarded populations, (see Appendix 4a, Table 37) demonstrated a general improvement in reading skill.

With regard to time allocation, the research findings (see Data Analysis section) indicate a general move from time spent on the development of listening skills and therapy to time devoted toward reading and writing (or typing). As the symbol program progressed there was a change in time allocation toward all the language arts.

The Evaluation Study findings indicate that reading tends to be generally supported by symbol communication. Further study would be valuable, however, in clarifying the relationship between symbol communication and reading.

2. SPEECH AND LANGUAGE DEVELOPMENT

Table 1

PROGNOSIS FOR THE DEVELOPMENT OF FUNCTIONAL SPEECH

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
Not applicable	20	13%	13	10%
Poor	112	71	88	70
Limited	20	13	22	17
Good	5	3	3	2
Total	157		126	

During the course of a one-year period, the data shows that among those people using symbols there is relatively no change in the prognosis for the development of functional speech. These statistics are based on the opinions of speech pathologists and symbol instructors in related fields. Although the total number of children being reported on is slightly lower in December 1975 (126) than the number in December 1974 (157), the largest percentage of the population is ranked as having a poor prognosis for the development of functional speech. In both time periods approximately 70% of the population falls under this category.

These statistics deal specifically with a predicted prognosis for the development of speech as an effective means of communication. This does not pertain to the general level of intelligibility of single words and short phrases. More specific information may be gleaned from the questions dealing with the highest level of communication obtained and the question of symbols as a substitute vs a complement to speech.

Table 2 which deals with the change in the level of functional speech shows that a portion of the population did show an improvement in this area.

Table 2

CHANGE IN LEVEL OF FUNCTIONAL SPEECH

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
Deteriorated over 2 years	5	3%	2	2%
Remained same over 2 years	116	76	76	69
Improved over 2 years	<u>32</u>	21	<u>32</u>	29
Total	153		110	

In those five cases where the level of functional speech was found to deteriorate, further examination of these cases revealed that in all the individuals reported, the deterioration could be attributed to a general physical condition. The diagnosis of such children was recorded as progressive central nervous system disorders or strokes causing severe or traumatic insults to the central nervous system. In such cases, each individual's general level of physical functioning was also found to have deteriorated. This degeneration in functional speech was not found to be directly related to the child's use of symbols in any way but to a general deteriorating physical condition.

The majority of reported cases remained at approximately the same level of efficiency -- approximately 70% of the population. It is interesting to note that there were 32 cases in which speech efficacy was seen to improve over a 2 year period. The 32 cases of reported improvement prior to the initial recording in December 1974 continued to show improvement in December 1975. While the use of symbols cannot be directly related in this instance to any specific area of improvement, in the same way, their use cannot be said to hamper or lessen oral development either. It has been speculated many times, that children using symbols have the tension and pressure removed from oral communication, and as a result are more relaxed orally

and able to speak more successfully. Where oral communication is no longer the central focus of attention, spontaneous change seems to occur with increased clarity of speech.

Table 3

HIGHEST LEVEL OF VERBAL COMMUNICATION

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
Not stated	4	3%	2	2%
No sound for communication	18	11	5	4
Vocalize	68	43	41	36
Yes/No (verbal)	27	17	22	19
Single words intelligible	18	11	20	18
Two words intelligible	12	8	10	9
More than two words - phrases	<u>10</u>	6	<u>13</u>	11
Total	157		113	

This table illustrates a finer breakdown of communication levels. The greatest percentage of the population appears to fall under the category of vocalizations which were defined as the highest level of verbal communication used as an approximation to a word. A general trend appears to be emerging in an upward direction favouring an increase in the intelligibility of speech. There are proportionately higher percentages of the population reported under "yes/no", "single intelligible words", "2-word combinations" and "more than 2-word phrases". Direct comparisons cannot be drawn because of the differences in recorded cases; however, a definite trend for increased efficiency appears to be developing.

Table 4

SUBSTITUTE/COMPLEMENT

Description	December 1974	
	No. of Children	% of Total
Symbols introduced as substitute	114	74%
Symbols introduced as complement	31	20
Symbols introduced as substitute, used as complement	10	6
Symbols introduced as complement, used as substitute	<u>0</u>	0
Total	155	

Another trend appears to be emerging when symbols are considered as a substitute rather than a complement to speech. Once again, no direct relationships may be drawn, because of the differences in the number of children recorded. The relative percentages of the total population recorded shows no change in the status of the symbol use. When symbols were introduced as a substitute for speech, the trend demonstrates that symbols are continuing to be used in the same capacity over the one-year recording period. Similarly, in those cases where symbols were introduced as a complement to oral speech, their use as a complement remained static. There were no recorded situations where symbols were introduced as a complement and used as a substitute.

Table 5

SPEECH ASSESSMENT SCORES

Description	December 1974	
	No. of Children	% of Total
Not stated/never assessed	17	11%
Within last year	103	66
Between 1 and 2 years	18	11
Over 2 and up to 5 years	14	9
Over 5 and up to 10 years	4	3
Over 10 years	<u>1</u>	1
Total	157	

The findings for the December 1975 recording period are incomplete, because this information was recorded every 3 months throughout the one-year study period. In many cases the most recent speech assessment did not fall within the final three month recording period. More specific information under this topic was provided through the sub-population as a representative sample of the total population. It should be noted that 66% of the population were assessed within the year prior to the study's commencement in December 1974, while only 11% of the whole population had never received a speech and language assessment. It was reported during all three interviews that speech and language assessments were being incorporated into a routine battery of assessment tools to measure a child's growth in all areas of development while communicating with symbols. Speech pathologists were concerning themselves with the charting of changes in language comprehension and oral muscular control needed for functional speech.

Upon close examination of the following table showing the prevalence of individual speech therapy sessions, one can notice another trend emerging.

Table 6

OCCURRENCE OF SPEECH THERAPY

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
No speech therapy	115	73%	95	81%
Once a week	9	6	4	3
Twice a week	20	13	6	5
Three times a week	10	6	6	5
Four to five times a week	<u>3</u>	2	<u>6</u>	5
Total	157		117	

It would appear that the vast majority of the population using symbols do not require or warrant individual speech therapy for better oral techniques control and articulation therapy. Cases for feeding therapy

were not included in these statistics. However, from the remaining number of cases, the amount of time spent in therapy seems to be increasing. This is not a surprising result, as the table outlining the upward trend in functional speech shows a gradual increase in the quality and efficacy of those children attempting to use more oral speech. With a very gentle increase in oral skills, it would be feasible to see a gradual increase in the frequency of speech therapy sessions also.

Table 7

ASSESSED LANGUAGE COMPREHENSION LEVEL

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
Grossly below age level	56	44%	33	52%
1-2 years below age level	42	33	20	31
At age level	19	15	11	17
Above age level	9	7	—	—
Total	126		64	

The table above shows the population rankings or levels as a whole. Further analysis and breakdown on the basis of I.Q. and Age revealed that the I.Q. variable was significant. The higher the I.Q., the better the language comprehension score. A similar effect for the Age variable was not found. Age did not have a significant relationship to the level of language comprehension achieved.

This significance of the I.Q. level is borne out in the recordings of the observed language comprehension level. In almost all cases, instructors tended to rate their children as appearing to understand auditory language at a higher level than test scores actually indicated.

Table 8

OBSERVED LANGUAGE COMPREHENSION LEVEL

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
Grossly below age level	44	44%	44	35%
1-2 years below age level	32	32	49	39
At age level	16	16	28	22
Above age level	<u>8</u>	8	<u>4</u>	3
Total	100		125	

A larger percentage of children were rated by their instructors as operating at a level of understanding at their appropriate age levels or 1 - 2 years below, while actual test scores showed the children to be operating at levels far below their chronological age levels. Unfortunately, the language level categories were too gross to capture any significant fluctuations in age level over a year recording period. More definite age levels between "1-2 years below" and "grossly below" may have indicated a more precise trend in language comprehension skills.

Table 9

HEARING DIAGNOSIS

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
Not stated	2	2%		
Severe hearing loss	4	4		
Mild hearing loss	7	7	4	14
Normal	<u>81</u>	86	<u>25</u>	86
Total	94		29	

Although a very large amount of data is missing for December 1975, the majority of the population in this study had hearing activity levels reported within normal limits for the development of speech and language. The number of cases where hearing activity was considered

to be severely impaired would warrant further investigation on a case study level. There are no significant data at the present time with which to assess the relative success of an alternative communication system (based, for example, on symbols) which is largely dependent on the auditory explanation.

3. CHANGES IN SOCIAL AND PSYCHOLOGICAL AREAS OF FUNCTIONING

Included in this section is information derived from

- (a) Frequency distributions;
- (b) T-tests;
- (c) Analysis of variance (ANOVA).

FREQUENCY DISTRIBUTIONS:

The following Tables (1-7) present frequency distributions which describe the total population in December 1974 and December 1975 on the Social and Psychological variables. A comparison of the frequency distributions reveals changes in general trends in the social and psychological aspects of functioning recorded over the one year period.

Social Variables:Table 1NATURE OF SOCIAL INTERACTION

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
No score	32	20	14	12
Attention seeking	10	6	5	4
Responds when addressed	88	56	50	41
Initiates	<u>27</u>	17	<u>52</u>	43
Total	157		121	

Table 2NUMBER OF SETTINGS

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
0	10	6	1	1
1	17	11	5	4
2	35	22	18	15
3	34	22	17	14
4	24	15	20	17
5	16	10	16	13
6	7	4	13	11
7	5	3	12	10
8	4	3	3	2
9	<u>5</u>	3	<u>16</u>	13
Total	157		121	

Psychological Variables:Table 3

INTEREST IN COMMUNICATION

Description	1974		1975	
	No. of Children	% of Total	No. of Children	% of Total
No interest	4	3	1	1
Little interest	10	6	4	3
Some interest	48	31	27	22
Great deal	<u>94</u>	60	<u>91</u>	74
Total	156		123	

Table 4

ATTITUDE TOWARD LEARNING NEW SYMBOLS

Description	1974		1975	
	No. of Children	% of Total	No. of Children	% of Total
Actively rejects learning new symbols	6	4	5	4
No interest in learning new symbols	8	5	1	1
Can be directed toward learning new symbols	24	15	12	10
Shows interest in learning new symbols	76	48	37	31
Asks meaning of unknown symbols on display	17	11	17	14
Initiates request for learning new symbols	21	13	37	31
Initiates and independently directs search for new symbols	<u>5</u>	5	<u>10</u>	8
Total	157		119	

Psychological Variables:Table 5

INTEGRATION OF SYMBOL COMMUNICATION

Description	1974		1975	
	No. of Children	% of Total	No. of Children	% of Total
Symbols identified but not used expressively	18	11	10	8
Uses symbols to respond to direct questions	46	29	9	8
Spontaneously responds with symbols, no initiation	6	4	7	6
Beginning to initiate symbol communication	19	12	16	13
Symbols are an integral part of child's communication with specific people and specific situations	40	25	24	20
Symbols are always an integral part of child's communication when situation structured for it to occur	25	16	41	34
Child directs all situations so that symbols form integral part of his total communication at all times	<u>3</u>	2	<u>12</u>	10
TOTAL	157		119	

Psychological Variables:Table 6INTEREST IN CREATING NEW SYMBOLS

Description	1974		1975	
	No. of Children	% of Total	No. of Children	% of Total
No interest in creating symbols	91	58	30	26
Contributes to creating symbols but highly dependent	38	24	33	29
Attempts to create new symbols but needs assistance to complete	10	6	18	16
Independently creates new symbols; poor quality	5	3	9	8
Independently creates new symbols; requires minimal assistance for symbol to be accepted	6	4	10	9
Independently creates acceptable symbols	6	4	10	9
Independently creates exceptional symbols	<u>1</u>	1	<u>4</u>	3
TOTAL	157		114	

Psychological Variables:Table 7ABILITY TO DEAL WITH LISTENER MISUNDERSTANDING

Description	1974		1975	
	No. of Children	% of Total	No. of Children	% of Total
No attempt to deal with situation	26	17	8	7
Repeats first message	25	16	5	4
Environmental clues accompany first message	41	26	11	9
Responds with alternative symbol message when directed by specific question	33	21	33	27
Responds with alternative symbol message when reminded	15	10	25	21
Independently produces alternative symbol message with effort	11	7	22	18
Spontaneously offers alternative symbol message	<u>6</u>	4	<u>16</u>	13
TOTAL	157		120	

T-TESTS :

In order to statistically study the patterns of change which appeared to be emerging through a comparison of the frequency distribution for December 1974 and December 1975, t-tests were conducted for the Social and Psychological variables. (see Appendix 5)

The t-tests yield "change scores", which refer to the difference on a particular variable, between the score recorded in December 1974 and that recorded December 1975. The most likely conclusion that can be drawn, with regard to the variables where "change scores" are statistically significant is that the changes can be seen as a result of the symbol program.

The following Social and Psychological variables are found to be statistically significant in their change values:

SOCIAL

1. *Nature of social interaction*
2. *Number of settings*

PSYCHOLOGICAL

1. *Interest in communication*
2. *Attitude toward learning new symbols*
3. *Integration of symbol communication*
4. *Interest in creating new symbols*
5. *Ability to deal with listener's misunderstanding*

All of the Social and Psychological variables that were included in the t-tests were found to be statistically significant. Since the items in Evaluation Study materials were developed using scales which progressed hierarchically from lowest to highest score, changes in the above variables would be viewed as positive gains in the child's development. These results tend to substantiate the casuistic reports of the instructors.

ANALYSIS OF VARIANCE :

As described in the Data Analysis Section p. 19, the population has been divided according to paired groupings of the independent or experimental variables - I.Q., Experience, Age, Disability. Table 8 is a summary of the tables of Analysis of Variance presented in Appendix 6(a,b,c,d). It is important to know which Social and Psychological variables are significantly affected by the experimental variables of I.Q., Experience, Age and Disability and which are not. For example, when grouped according to I.Q. by Age, *Interest in communication* is significantly affected by I.Q. Therefore, an instructor

could expect a high level of interest in communication from those in the Non-retarded group. Similarly, when the population is grouped according to Disability by Experience, the main effects of Disability are statistically significant for *Number of settings*. As explained in the Data Analysis section, (p. 32), when the effect of Disability was shown to be significant, the pattern was such that the moderately disabled group scored higher than both the mildly and severely disabled groups. In other words, an instructor could expect that moderately disabled people would use symbols in more settings than either mildly or severely disabled individuals.

On the other hand, when the population is grouped according to Age by I.Q., the main effects of Age are not statistically significant for *Interest in communication*. Therefore, while the effects of I.Q. do significantly affect *Interest in communication*, a child's Age does not. A similar form of interpretation applies to all the other variables presented in Table 8.

The instructor should be aware of which Social and Psychological variables are significantly affected by I.Q. Experience, Age and Disability and which are not, in order that expectations for development and change are kept realistic.

SUMMARY OF ANALYSIS OF VARIANCE FOR SOCIAL AND PSYCHOLOGICAL VARIABLES

	IQ		Experience			Age		Disability	
	IQ x Age	IQ x Exp	Exp x IQ	Exp x Age	Exp x Dis	Age x IQ	Age x Exp	Dis x Exp	
<u>Social</u>									
1. <i>Nature of social interaction</i>	NS	-	-	-	NS	S	-	S	
2. <i>Number of settings</i>	S	-	-	-	S	S	-	S	
<u>Psychological</u>									
3. <i>Alertness</i>	S	-	-	-	-	S	-	-	
4. <i>Interest in communication</i>	S	S	NS	-	-	NS	-	-	
5. <i>Speed of learning symbols</i>	S	-	-	-	-	S	-	-	
6. <i>Attitude toward learning new symbols</i>	S	-	-	-	S	S	-	NS	
7. <i>Interest in creating new symbols</i>	S	S	S	-	-	S	-	-	
8. <i>Ability to deal with listener misunderstanding</i>	S	-	-	NS	-	S	S	-	
9. <i>Integration of symbol communication</i>	S	-	-	-	S	S	-	S	

CODE

S - statistically significant
at .05 level
NS - not significant
- - not analyzed

4. THE FAMILY

Before the school year ended in the summer of 1975, one hundred and eight questionnaires were distributed to the parents of children in our study. The sample chosen included only those children who were residing at home, for it was the consensus of the research team that data of a different sort should be asked of the children-in-residence. Basically our aim was:

1. To further describe the population with which we were dealing (i.e. family size, siblings' schooling, previous exposure to a disability);
2. To ascertain how the child was communicating at home (i.e. with symbols); and
3. To further explore problems and expectations of parents.

The importance of the home environment, and of family relationships and interactions has been acknowledged in much research. (Bossard and Ball, '48; Mishler and Waxler, '68; Frankiel, '59)

The quality of family relationships has profound effects, both positive and negative, on the emotional development and the social adjustment of all members of the family. (Report on the Committee on Methods and Scope, p. 3)

Much of the child's orientation to society and skill-training takes place within the family.

This was intended as an exploratory study and, as such, sought only to indicate possible relationships. Due to the nature of the study and the fact that this area had never previously been explored, data was, to a great extent, descriptive in character and generalizations beyond this group were difficult to make. Findings were based on the returns of eight-four homes.

DESCRIPTION:

Seventy-two per cent of the homes from which questionnaires were returned housed two adults, while the actual number ranged from one to eight adults in the house. While most families had two or three children, the range was from one to ten. The age of the child using symbols was quite varied, ranging from three years of age to 20, although the majority (87 per cent) were between six and 14. The children are fairly evenly split on the sex variable. Almost half of this population has a sibling in primary school, although the range is once more varied, from pre-school to housewife or otherwise employed.

Most mothers and fathers indicated that they have achieved grade twelve or thirteen in their formal education. Although sixty-two of the mothers were housewives, the remainder were employed in all aspects of business. Forty-two per cent of fathers were employed in labour fields. Most parents (69 per cent) are English-speaking (although we are aware of eight other languages represented), and have never previously been exposed to any type of handicap.

GENERAL FINDINGS:

Based on parent's estimates of the child's extent of communication at home, it was possible to divide the child population according to their communication with and without symbols and to distinguish four types of communicating patterns. The first group, composed of 27 children, were "communicators". Their overall frequency of communication was high, no matter what sort of communication technique they were using. They communicated as frequently with symbols as they did without. Generally, parents of these children appeared to be positive about symbols. Typically,

this was a home where siblings interacted with the symbol-using child, and where symbols were introduced after the child had developed an adequate personal communication system. These parents typically stated the advantage of symbols for "outsiders" not familiar with the child.

The second group of fourteen children communicated with symbols more than they did without. These generally were those who used symbols as a substitute for speech. Physical involvement tended to be greater, with less access to other means, such as gesturing. There were also several very young children (3-5 years) whose first exposure to schooling was in a symbol program, and who had focused on the use of symbols rather than on developing other less refined speech augmentatives.

The third group of thirty-four children used symbols less than other means available to them. These were primarily the children who used symbols as a complement to speech, and who had within the home setting a well-established and proficient communication system independent of symbols; however, there were also children in this group new to symbols, who were using them less frequently.

It is interesting to note that parents in this group tended to have slightly higher expectations of their child in regard to speech and schooling than parents in other groups. The difference in numbers between the second and third groups would suggest that the use of symbol communication at home was not fully established, nor perhaps accepted. Most children were relying on an alternate method of communication at home; the reason for this situation, however, may only be speculation. This would be an appropriate area for individual follow-up by instructors.

The fourth group of nine children were the "low" communicators who were generally more silent. These children tended to come from homes where symbols were not used or understood, where the child was isolated (e.g. no siblings) and where there existed a definite demarcation between home

and school. As might be expected, those who used alternate means most often were rated by their parents as being more proficient in doing so than in using symbols. The same held true for symbol users (i.e. children who used symbols more often than another means were rated as more proficient with symbols.) The following comments are presented as example cases for each category discussed.

Group 1 - High Communicators

Parents of 10-year-old	)	"Symbols are not a perfect means
using symbols as a	)	of communicating but they have
substitute for speech	)	given us hope for our child's
	)	future."

Group 2 - Communicates more with Symbols than without

Parents of 10-year-old	)	"Looking back on the past ten
using symbols as a	)	years and considering all aspects
substitute for speech	)	of our child's handicap, the
	)	greatest and most frustrating
	)	problem for her and us was her
	)	inability to talk. Now she can."

Group 3 - Communicates more without Symbols than with

Parents of 13-year-old	)	"Having lived with Mary, our
using symbols as a	)	understanding and perception of
complement to another	)	her wants, and the things she
means	)	is desirous of communicating is
	)	vastly superior to others. The
	)	Bliss board is an invaluable aid
	)	in communicating with those who
	)	do not live with her."

Group 4 - Low Communicators

Parents of three year	)	"We are not convinced that
old - relation to	)	symbols can replace the alphabet.
speech not stated	)	To use symbols is to set a limit
	)	to the future development of the
	)	child."

As can be seen from this data a fairly large number of children (43) were indicated to be using symbols infrequently and were not very proficient. The relationship is significant and the direction of the relationship warrants further study. It might also be noted here, that of the

twenty-six ethnic families in our study, twenty-two indicated that their child could understand the foreign language, but fifteen stated this language to be unavailable on the child's board.

Most parents were in agreement with the professional prognosis upon whether the child would use an alternate means of communication either as a supplement to or as a substitute for speech. Although a few (5) felt their child would eventually speak, twice this number stated their uncertainty with regard to future communication. The vast majority also expected that their child would remain attending or would eventually attend a special school for the physically handicapped.

In a section related to where parents obtained information pertaining to their child's potential, the following results were found: with regard to physical prognosis, eighty-six percent received the information from a doctor; with regard to speech, fifty-seven percent received the information from the speech therapist; with regard to education, as many parents received the information from doctors as from teachers. Regardless of what information they had received, or from whom, almost sixty-two percent of the parents indicated their desire for more information and training, notably in instruction in symbol use, but in updating and available resources as well.

DISCUSSION

In general, there appear to be several factors that are crucial to the child's communication at home:

1. The number of children at home (for interaction and time);
2. The number of hours spent at home;
3. How symbols are used in relation to speech or another alternative; and
4. The actual use of symbols.

Ethnicity plays an important role in this last area as it might be anticipated that a family that does not understand the word below the symbol is faced with two incomprehensible mediums and is less likely to encourage its use. Parental expectations in communication and education are related to the use of symbols as a complement or substitute for speech, a relationship that may be de-emphasized with the increased acceptance of symbol use. Parents agreed with professionals with regard to educational expectations more often than on speech expectations, perhaps indicating the stigma and hesitation in acceptance of speech alternatives.

The family is of vital importance in the child's development, and therefore, familial needs must be recognized; familial needs such as:

1. The need for more and improved professional input;
2. The need for a medium that they can understand and cope with;
3. The need for greater parent involvement.
It might even be suggested that the parents be included in the medical-social conferences regarding their child, enabling them to bridge the sometimes tremendous gap encountered between clinician-teacher-home.

Information regarding ways to stimulate parental interest can be found in the Program section of the Handbook, p. 217

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APPENDIX 1

LIST OF VARIABLES STUDIED

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<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Ability to create new symbols</i>	The child's ability to create new symbols (see also <i>Interest in creating.</i>)	P.P.R. Comm. #13	0-6
<i>Ability to deal with listener's misunderstanding</i>	Communication under stress (the child's ability to deal with situations when his meaning is not understood)	P.P.R. Comm. #5	0-9
<i>Ability to learn auditorily</i>	Assessment of auditory learning modality	P.P.R. IDF #26	0-4
<i>Ability to learn visually</i>	Assessment of visual learning modality	P.P.R. IDF #26	0-4
<i>Ability to select one picture from many</i>	Complexity level of pictures from which child can discriminate	P.P.R. Acad. #10	1-5
<i>Ability to select one shape from many</i>	Largest number of shapes among which child can discriminate	P.P.R. Acad. #9	1-5
<i>Adjectives</i>	Frequency of use of adjectives	P.P.R. Comm. #9	0-14
<i>Adverbs</i>	Frequency of use of adverbs	P.P.R. Comm. #9	0-14
<i>Age</i>	Age of the child	P.P.R. Cover sheet	1-10
	Chronological age score	Recoded	1-4
<i>Alertness</i>	Level of alertness shown by the child	P.P.R. IDF #18	0-3
<i>Alphabet-endings</i>	Proficiency with non-symbol strategy use of alphabet for endings	P.P.R. Comm. #12a	0-4
<i>Alphabet-initial consonant</i>	Proficiency with non-symbol strategy use of alphabet for initial consonant	P.P.R. Comm. #12a	0-4
<i>Alternate device required</i>	Some other device is needed	P.P.R. Comm. #3	0-1
<i>Area of largest time allocation</i>	Specific area of greatest time allocation	P.P.R. Acad. #1	0-8
<i>Articles</i>	Frequency of use of articles	P.P.R. Comm. #9	0-14
<i>Assessed I.Q.</i>	Assessed I.Q. level of the child	P.P.R. IDF #16	1-9

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Assessed language comprehension</i>	Language comprehension level assessment	P.P.R. IDF #10	1-4
<i>Assessed language comprehension (within 3 months)</i>	Formally assessed language comprehension level within the last three months	P.P.R. Comm. #18	1-4
<i>Atomistic approach</i>	Atomistic reading approach presently being used	P.P.R. Acad. #11	0-5
<i>Atomistic suitability</i>	Suitability of atomistic approach	P.P.R. Acad. #12	0-20
<i>Attitude to learning new symbols</i>	Child's attitude towards learning new symbols	P.P.R. Psych. #3	0-6
<i>Auditory attention</i>	Child's ability to attend to auditory stimuli	P.P.R. IDF #25	0-4
<i>Auxiliary verbs</i>	Frequency of use of auxiliary verbs	P.P.R. Comm. #9	0-14
<i>Body movement</i>	Proficiency with non-symbol strategy use of body movement	P.P.R. Comm. #12a	0-4
<i>Brief and confusing</i>	Child uses brief and confusing sentences	P.P.R. Comm. #8	0,1
<i>Brief and succinct</i>	Child uses brief and succinct sentences	P.P.R. Comm. #8	0,1
<i>Change in functional speech</i>	Change in functional speech	P.P.R. IDF #120	1-3
<i>Child's frustration</i>	Degree of frustration experienced in communication	P.P.R. IDF #19	1-3
<i>Child's sentence order</i>	Model of sentence order used by child	P.P.R. Comm. #6c	0-3
<i>Colour concept</i>	Child's level of relating to colours	P.P.R. Acad. #8	1-5
<i>Communication during reading activities</i>	Extent of symbol communication during reading activities	P.P.R. Acad. #3	0-4
<i>Communication least with familiar adults</i>	Level at which child communicates <u>least</u> with familiar adults	P.P.R. Soc. #1	0-4

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Communication least with non-speaking peers</i>	Level at which child communicates <u>least</u> with non-speaking peers	P.P.R. Soc. #1	0-4
<i>Communication least with speaking peers</i>	Level at which child communicates <u>least</u> with speaking peers	P.P.R. Soc. #1	0-4
<i>Communication least with unfamiliar adults</i>	Level at which child communicates <u>least</u> with unfamiliar adults	P.P.R. Soc. #1	0-4
<i>Communication least with younger children</i>	Level at which child communicates <u>least</u> with younger children	P.P.R. Soc. #1	0-4
<i>Communication most with familiar adults</i>	Level at which child communicates <u>most</u> with familiar adults	P.P.R. Soc. #1	0-4
<i>Communication most with non-speaking peers</i>	Level at which child communicates <u>most</u> with non-speaking peers	P.P.R. Soc. #1	0-4
<i>Communication most with speaking peers</i>	Level at which child communicates <u>most</u> with speaking peers	P.P.R. Soc. #1	0-4
<i>Communication most with unfamiliar adults</i>	Level at which child communicates <u>most</u> with unfamiliar adults	P.P.R. Soc. #1	0-4
<i>Communication most with younger children</i>	Level at which child communicates <u>most</u> with younger children	P.P.R. Soc. #1	0-4
<i>Conjunctions</i>	Frequency of use of conjunctions	P.P.R. Comm. #9	0-14
<i>Diagnosis</i>	Child's diagnosis	P.P.R. IDF #1	0-3
<i>Disability</i>	Disability, recoded by clustering ELEQ1-5 and MOB scores		1-3
<i>Display type</i>	Display type used by child	P.P.R. Comm. #2a	0-2

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Eclectic approach</i>	Eclectic reading approach presently being used	P.P.R. Acad. #11	0-4
<i>Eclectic suitability</i>	Suitability of eclectic approach	P.P.R. Acad. #12	0-16
<i>Educational placement</i>	Educational placement of the child	P.P.R. IDF #6	1-6
<i>Else</i>	Child uses another sentence style	P.P.R. Comm. #8	0,1
<i>Exclamation proficiency</i>	Proficiency of use of exclamation	P.P.R. Comm. #11a	0-4
<i>Experience</i>	Experienced symbol users	Recoded INTRO score	1,2
<i>Eye pointing</i>	Proficiency with non-symbol strategy use of eye "pointing"	P.P.R. Comm. #12a	0-4
<i>Facial expression</i>	Proficiency with non-symbol strategy use of facial expression	P.P.R. Comm. #12a	0-4
<i>Feeding problems</i>	Child's feeding problems	P.P.R. IDF #4	0-4
<i>Gestures for content</i>	Proficiency with non-symbol strategy use of gestures for content	P.P.R. Comm. #12a	0-4
<i>Gestures for feeling intensity</i>	Proficiency with non-symbol strategy use of gestures for intensity of feeling	P.P.R. Comm. #12a	0-4
<i>Global approach</i>	Global reading approach presently being used	P.P.R. Acad. #11	0-3
<i>Global suitability</i>	Suitability of global approach	P.P.R. Acad. #12	0-12
<i>Has electronic equipment</i>	The child has electronic equipment	P.P.R. Comm. #3	0,1
<i>Hearing aid</i>	Whether the child wears or has worn a hearing aid	P.P.R. Comm. #17	1-4
<i>Hearing diagnosis</i>	Formal hearing diagnosis	P.P.R. IDF #24	1-4

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Hearing diagnosis (within 3 months)</i>	Formal hearing diagnosis within the last 3 months	P.P.R. Comm. #16	1-4
<i>Highest level of verbal communication</i>	The child's highest level of verbal communication	P.P.R. Comm. #15	0-6
<i>Highest visual level</i>	Highest level of visual material to which child relates	P.P.R. Acad. #5	0-7
<i>Highest skill area</i>	Highest skill area attained	P.P.R. Comm. #4a	0-9
<i>Improvement required</i>	The child requires improved electronic equipment	P.P.R. Comm. #3	0,1
<i>Incorporation of symbols into play materials</i>	Degree to which symbols are incorporated into play materials	P.P.R. Acad. #6b	0-7
<i>Indicating part of speech</i>	Proficiency of use of part of speech indicators	P.P.R. Comm. #11a	0-4
<i>Individual instruction</i>	Individualized instruction for reading	P.P.R. Acad. #13	0,1
<i>Reading instruction</i>	Frequency of reading instruction	P.P.R. Acad. #18	0-6
<i>Integration of symbol communication</i>	Integration of symbols into person's total communication	P.P.R. Psych. #2	0-6
<i>Integration of symbols into reading materials</i>	Symbol integration into reading instructional media used by child	P.P.R. Acad. #15	0-4
<i>Interest in communication</i>	Child's interest in communication	P.P.R. IDF #14	1-4
<i>Interest in creating new symbols</i>	The child's ability to create new symbols (see also <i>Ability to create...</i>)	P.P.R. Comm. #13	0-6
<i>Interrogative reversals</i>	Frequency of use of interrogative reversals	P.P.R. Comm. #9	0-14
<i>Introduced as complement, used as substitute</i>	Initiated as a complement to speech, now serving as a substitute	P.P.R. IDF #13	0,1

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Introduced as substitute, used as complement</i>	Initiated as a substitute for speech, now serving as a complement	P.P.R. IDF #13	0-1
<i>Introduction</i>	Date of introduction to symbols	P.P.R. cover sheet	1-6
<i>I.Q.</i>	Observed I.Q. score		1, 2
<i>I.Q. assessment in last 3 months</i>	The child's I.Q. assessment if taken in the last 3 months	P.P.R. Psych. #1	1-9
<i>Known vocabulary</i>	Amount of display known	P.P.R. Comm. #2b	0-100
<i>Language arts time</i>	Allocation of time to language arts	P.P.R. Acad. #1	0-10
<i>Largest time allocated</i>	Greatest amount of time allocation	P.P.R. Acad. #1	0-10
<i>Level grouping</i>	Level grouping for reading	P.P.R. Acad. #13	0, 1
<i>Level 0 score</i>	Child's total score at level 0	P.P.R. Acad. #4	0-6
<i>Level 1 score</i>	Child's total score for level 1 (pre-school)	P.P.R. Acad. #4	0-12
<i>Level 2 score</i>	Child's total score for level 2 (early kindergarten)	P.P.R. Acad. #4	0-12
<i>Level 3 score</i>	Child's total score for level 3 (late kindergarten/early grade 1)	P.P.R. Acad. #4	0-12
<i>Level 4 score</i>	Child's total score for level 4 (pre-primer)	P.P.R. Acad. #4	0-12
<i>Level 5 score</i>	Child's total score for level 5 (primer)	P.P.R. Acad. #4	0-12
<i>Level 6 score</i>	Child's total score for level 6 (grade 2)	P.P.R. Acad. #4	0-12
<i>Level 7 score</i>	Child's total score for level 6+	P.P.R. Acad. #4	0-12

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Long and clear</i>	Child uses long and clear sentences	P.P.R. Comm. #8	0, 1
<i>Means of communication</i>	Means of communication used by the child	P.P.R. Comm. #1	0-3
<i>Mobility</i>	Child's mobility method	P.P.R. IDF #3	0-5
<i>Nature of social interaction</i>	Most frequent behavior displayed by child in communicating	P.P.R. Soc. #2	0-3
<i>Negatives</i>	Frequency of use of negatives	P.P.R. Comm. #9	0-14
<i>No need of electronic equipment</i>	Electronic equipment is not needed by the child	P.P.R. Comm. #3	0, 1
<i>Non-graded grouping</i>	Non-graded grouping for reading	P.P.R. Acad. #13	0, 1
<i>Non-retarded grade</i>	Regular grade placement on introduction	P.P.R. cover sheet	1-9
<i>Noun modifiers</i>	Frequency of use of noun modifiers	P.P.R. Comm. #9	0-14
<i>Nouns</i>	Frequency of use of nouns	P.P.R. Comm. #9	0-14
<i>Number of play materials</i>	Number of play materials utilized by the child, providing "symbol readiness" training	P.P.R. Acad. #6a	0-5
<i>Number of settings</i>	Number of settings where child uses symbols to communicate	P.P.R. Soc. #3	0-9
<i>Number of symbols</i>	Number of symbols on the child's display	P.P.R. Comm. #2a	0-900
<i>Number of symbols in best sentence</i>	Number of symbols in the child's best sentence	P.P.R. Comm. #7	0-20
<i>Number of symbols in typical sentence</i>	Number of symbols in the child's typical sentence	P.P.R. Comm. #7	0-20
<i>Number of symbols related to</i>	Visual range	P.P.R. IDF #22	0-10

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Observed I.Q.</i>	Instructor - observed I.Q. level of the child	P.P.R. IDF #17	1-9
<i>Observed language comprehension</i>	Instructor - observed language comprehension level	P.P.R. IDF #11	1-4
<i>Other modality</i>	Assessment of alternate learning modality	P.P.R. IDF #26	0-4
<i>Other non-symbol strategies</i>	Proficiency with other non-symbol strategies	P.P.R. Comm. #12a	0-4
<i>Other strategies</i>	Proficiency of use of other symbol strategies	P.P.R. Comm. #11a	0-4
<i>Paired instruction</i>	Paired instruction for reading	P.P.R. Acad. #13	0, 1
<i>Peer involvement</i>	Peer involvement in reading activities	P.P.R. Acad. #19	0-4
<i>Prepositions</i>	Frequency of use of prepositions	P.P.R. Comm. #9	0-14
<i>Proficiency of 'big and little' meaning</i>	Proficiency of use of symbol strategy of big and little meaning	P.P.R. Comm. #11a	0-4
<i>Proficiency of combining strategy</i>	Proficiency of use of symbol strategy for combining	P.P.R. Comm. #11a	0-4
<i>Proficiency of 'opposite' strategy</i>	Proficiency of use of symbol strategy for "opposite"	P.P.R. Comm. #11a	0-4
<i>Proficiency of symbol part strategy</i>	Proficiency of use of symbol part strategy	P.P.R. Comm. #11a	0-4
<i>Proficiency with symbols</i>	Sum of proficiency ratings for skill with symbols	P.P.R. Comm. #4b	0-36
<i>Pronouns</i>	Frequency of use of pronouns	P.P.R. Comm. #9	0-14
<i>Reading proficiency</i>	Reading proficiency of child	P.P.R. Acad. #17	0-6
<i>Reading score</i>	Child's total score on rating scale for reading/reading-readiness level	P.P.R. Acad. #4	0-90

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Relativizer proficiency</i>	Proficiency of use of relativizer	P.P.R. Comm. #11a	0-4
<i>Requires but unavailable</i>	The child requires electronic equipment but it is unavailable	P.P.R. Comm. #3	0, 1
<i>Residence</i>	Residence of the child	P.P.R. cover sheet	0-3
<i>Retarded grade</i>	Retarded grade placement on introduction	P.P.R. cover sheet	0-3
<i>Secondary verbs</i>	Frequency of use of secondary verbs	P.P.R. Comm. #9	0-14
<i>Sex</i>	Sex of the child	P.P.R. cover sheet	1, 2
<i>Skill areas</i>	Number of skill areas checked	P.P.R. Comm. #4a	0-9
<i>Skill in symbols</i>	The child's skill with symbols	P.P.R. Comm. #4a	0-200
<i>Smallest picture size</i>	Smallest size picture to which child can relate	P.P.R. Acad. #7	1-4
<i>Speech assessment</i>	Last formal speech assessment	P.P.R. IDF #9	0-5
<i>Speech therapy</i>	The frequency of speech therapy sessions for the child	P.P.R. Comm. #19	0-4
<i>Speech prognosis</i>	Prognosis for speech	P.P.R. IDF #8	0-3
<i>Speed of learning symbols</i>	The speed with which the child learns symbols	P.P.R. Comm. #14	0-4
<i>Spelling</i>	Proficiency with non-symbol strategy use of spelling	P.P.R. Comm. #12a	0-4
<i>Student-directed programme</i>	Program orientation is student-directed	P.P.R. Acad. #14	0, 1
<i>Substitute-complement</i>	Symbols are used as a substitute for speech, and were introduced as such	P.P.R. IDF #13	0, -
	Symbols are used as a complement to speech, and were introduced as such	P.P.R. IDF #13	0, 1

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
SYMSKILL	The child's skill with symbols	Recoded	0-122
<i>Syntax model presented</i>	Model of symbol syntax presented by instructor	P.P.R. Comm. #6b	0-3
<i>Teacher-directed programme</i>	Program orientation is teacher-directed	P.P.R. Acad. #14	0, 1
<i>Teacher-student directed programme</i>	Program orientation is a combination of teacher-student input	P.P.R. Acad. #14	0, 1
<i>Tense proficiency</i>	Proficiency of use of tense	P.P.R. Comm. #11a	0-4
<i>Time for communication</i>	Allocation of time to communicating activities	P.P.R. Acad. #2	0-10
<i>Time for listening</i>	Allocation of time to listening activities	P.P.R. Acad. #2	0-10
<i>Time for writing</i>	Allocation of time to writing activities	P.P.R. Acad. #2	0-10
<i>Types of statements</i>	Number of statement-types used by child	P.P.R. Comm. #6c	0-6
<i>Verbs</i>	Frequency of use of main verbs	P.P.R. Comm. #9	0-14
<i>Visual attention</i>	Child's ability to attend to visual stimuli	P.P.R. IDF #23	0-4
<i>Visual problems</i>	Visual problems	P.P.R. IDF #21	0-2
<i>"Wh" questions</i>	Frequency of use of "wh" questions	P.P.R. Comm. #9	0-14
<i>Working use of actions</i>	"Actions" are part of child's working vocabulary	P.P.R. Comm. #10	0, 1
<i>Working use of descriptive words</i>	"Descriptive words" are part of child's working vocabulary	P.P.R. Comm. #10	0, 1
<i>Working use of emotions</i>	"Emotions" are part of child's working vocabulary	P.P.R. Comm. #10	0, 1
<i>Working use of manners</i>	"Manners" are part of child's working vocabulary	P.P.R. Comm. #10	0, 1

<u>Variable Name</u>	<u>Description</u>	<u>Origin</u>	<u>Score Range</u>
<i>Working use of people</i>	"People" are part of child's working vocabulary	P.P.R. Comm. #10	0,1
<i>Working use of questions</i>	"Questions" are part of child's working vocabulary	P.P.R. Comm. #10	0,1
<i>Working use of things</i>	"Things" are part of child's working vocabulary	P.P.R. Comm. #10	0,1
<i>Working use of yes, no</i>	"Yes, no" is part of child's working vocabulary	P.P.R. Comm. #10	0,1
<i>Working vocabulary</i>	Amount of display serving as working vocabulary	P.P.R. Comm. #2b	0-100

APPENDIX 2

CODING FOR INDEPENDENT VARIABLES
AGE, I.Q., EXPERIENCE, DISABILITY,
SYMBOLS AS A SUBSTITUTE AND SYMSKILL

pages 113 - 115

CODING FOR VARIABLES

Description of the Recoded Variables C.Age, I.Q., Experience, Disability and Symbols as a Substitute for Speech

<u>Variable</u>	<u>Code</u>	<u>Original Meaning</u>	<u>Recoded to Mean</u>
C.Age	1	- age 1- 5	Age 1- 5
	2	- age 6- 9	Age 6-11
	3	- age 10-15	Age 12-15
	4	- age 16-30 and over	Age 16 and over
I.Q.	1	- observed I.Q.=severely retarded-borderline	Retarded (I.Q. $\leq$ 79)
	2	- observed I.Q.=low average-superior	Non-retarded (I.Q. $\geq$ 80)
Experience	1	- symbols introduced between Sept. 1974 and Feb. 1975 (during study)	Inexperienced
	2	- symbols introduced between Oct. 1971 and Aug. 1974 (prior to study)	Experienced
Disability (see p. 115)	1	- walks with aid/independently, electronic equipment not required for communication	Mildly Disabled
	2	- using wheelchair, electronic equipment not required for communication	Moderately Disabled
	3	- using wheelchair, has or requires electronic equipment for communication	Severely Disabled
Symbols as Substitute	1	- symbols introduced as substitute or complement to speech and now serving as substitute	Substitute
	2	- symbols introduced as substitute or complement to speech and now serving as complement	Complement

SYMSKILL

The following variables were collapsed in order to compose the variable *Skill in symbols*.

	<u>Origin</u>
(1) <i>Proficiency with symbols</i>	P.P.R. - Comm. #4b
(2) <i>Types of statements</i>	P.P.R. - Acad. #2
(3) <i>Proficiency scores for categories in the subject's vocabulary.</i>	P.P.R. - Comm. #10
i.e. <i>Working use of yes, no</i>	
<i>Working use of manners</i>	
<i>Working use of questions</i>	
<i>Working use of people</i>	
<i>Working use of actions</i>	
<i>Working use of emotions</i>	
<i>Working use of descriptive words</i>	
<i>Working use of things</i>	
(4) <i>Proficiency scores for symbol strategies.</i>	P.P.R. - Comm. #11a
i.e. <i>Exclamation proficiency</i>	
<i>Indicating part of speech</i>	
<i>Proficiency of "big and little" meaning</i>	
<i>Proficiency of combining strategy</i>	
<i>Proficiency of "opposite" strategy</i>	
<i>Proficiency of symbol part strategy</i>	
<i>Relativizer proficiency</i>	
<i>Tense proficiency</i>	
<i>Other strategies</i>	
(5) <i>Proficiency scores for non-symbol strategies.</i>	P.P.R. - Comm. #12a
i.e. <i>Alphabet-endings</i>	
<i>Alphabet-initial consonant</i>	
<i>Body movement</i>	
<i>Eye pointing</i>	
<i>Facial expression</i>	
<i>Gestures for content</i>	
<i>Gestures for feeling intensity</i>	
<i>Spelling</i>	
<i>Other non-symbol strategies</i>	

MEANS OF COMMUNICATION

<u>Code</u>	<u>Original Meaning</u>	<u>Recoded to Mean</u>
1	- gesture - facial expression - vocalization - behaviour	Primitive
2	- verbal yes-no responses - non-verbal yes-no responses - picture board	Basic Means
3	- symbol board - alphabet - word board - alphabet board or spelling board - typewriter - other	Sophisticated

DISABILITY

This variable was composed from *Mobility* (IDF #3) and *Electronic Equipment Needs* (Comm. #3).

i.e. *No need of electronic equipment*
Has electronic equipment
Requires but unavailable
Improvement required

<u>Code</u>	<u>Original Meaning</u>	<u>Recoded to Mean</u>
1	- walks independently/with aid + <i>No need of electronic equipment</i>	Mild
2	- operates electric wheelchair/hand operates wheelchair/dependent in wheelchair + <i>No need of electronic equipment</i>	Moderate (Medium)
3	- operates electric wheelchair/hand operates wheelchair/dependent in wheelchair + <i>Has electronic equipment/Requires but unavailable/Improvement required</i>	Severe

APPENDIX 3

FREQUENCY CHARTS FOR
INITIAL ASSESSMENT VARIABLES

pages 116 - 126

INITIAL ASSESSMENT VARIABLES

For many of the factors discussed in the preceding section, frequency tables are available which describe the total population at the beginning of the Study, as recorded in December 1974, on the variables relevant to the initial assessment.

FREQUENCY TABLES FOR TOTAL POPULATION, DECEMBER 1974, ON THOSE VARIABLES CONSIDERED AS PART OF INITIAL ASSESSMENT

DESIRE TO COMMUNICATE:

(a) INTEREST IN COMMUNICATION

Description	No. of Children	% of Total
No interest	4	3
Little interest	10	6
Some interest	48	31
Great deal of interest	94	60
Total	156	

(b) ABILITY TO DEAL WITH LISTENER'S MISUNDERSTANDING

Description	No. of Children	% of Total
No attempt to deal with situation	26	17
Repeats first message	25	16
Environmental clues accompany first message	41	26
Responds with alternative symbol message when directed by specific question	33	21
Responds with alternative symbol message when reminded	15	10
Independently produces alternative symbol message with effort	11	7
Spontaneously offers alternative symbol message	6	4
Total	157	

PRESENT MEANS OF COMMUNICATION :

(a) MEANS OF COMMUNICATION EMPLOYED BY CHILD

Description	No. of Children	% of Total
N.S.	3	2
Primitive	79	50
Basic	39	25
Sophisticated	<u>36</u>	23
Total	157	

Primitive means included gesture, facial expressions, vocalizations, behaviour.

Basic means included verbal and non-verbal yes-no responses, picture board.

Sophisticated means included symbol board, alphabet, wordboard, spelling board, typewriter, other. (see Appendix 2, p. 115)

NOTE: Other possible means of communication have been added since Evaluation Study materials designed.

LANGUAGE COMPREHENSION :

(a) ASSESSED LANGUAGE COMPREHENSION LEVEL

Description	No. of Children	% of Total
Grossly below age level	56	44
1-2 years below age level	42	33
At age level	19	15
Above age level	<u>9</u>	7
Total	126	

(b) OBSERVED LANGUAGE COMPREHENSION

Description	No. of Children	% of Total
Grossly below age level	44	44
1-2 years below age level	32	32
At age level	16	16
Above age level	<u>8</u>	8
Total	100	

LEVEL OF FUNCTIONAL SPEECH

(a) HIGHEST LEVEL OF VERBAL COMMUNICATION

Description	No. of Children	% of Total
Not stated	4	3
No sound used for communication	18	11
Vocalize	68	43
Yes-no	27	17
Single words; intelligible	18	11
Two words; intelligible	12	8
More than two words; phrases	10	6
Total	157	

POTENTIAL FOR SPEECH - PROGNOSIS

(a) CHANGE IN FUNCTIONAL LEVEL OF SPEECH

Description	No. of Children	% of Total
Deteriorated	5	3
No change	116	76
Improved	32	21
Total	153	

(b) SPEECH PROGNOSIS

Description	No. of Children	% of Total
Not applicable	20	13
Poor	112	71
Limited	20	13
Good	5	3
Total	157	

(c) SUBSTITUTE/COMPLEMENT

Description	No. of Children	% of Total
Symbols introduced and used as substitutes	114	74
Symbols introduced and used as complements	31	20
Symbols introduced as substitutes and used as complements	10	6
Symbols introduced as complements and used as substitutes	0	0
Total	155	

PRESENT DEVELOPMENTAL LEVEL :

(a) HIGHEST LEVEL OF VISUAL STIMULI CHILD RELATES TO

Description	No. of Children	% of Total
Not appropriate	69	44
Concrete objects	3	2
Scaled representation of concrete objects	3	2
Picture in which child <u>names</u> objects	7	4
Picture in which child <u>describes</u> functions	5	3
Simplified drawing of objects e.g. stick figures	1	1
Meaningful symbols, e.g. Blissymbolics	35	22
Arbitrary symbols, e.g. letters, numbers	<u>34</u>	22
Total	157	

(b) CHILD'S ABILITY TO LEARN SYMBOLS

Description	No. of Children	% of Total
Not stated	7	4
Continuous drill	18	11
Slow, some drill	39	25
Average	44	28
Very good	<u>49</u>	31
Total	157	

(c) ABILITY TO CREATE NEW SYMBOLS

Description	No. of Children	% of Total
No interest	91	58
Contributes to creating but highly dependent	38	24
Attempts to create but needs assistance to complete	10	6
Independently creates-- poor quality	5	3
Independently creates-- needs minimal assistance for acceptable symbol	6	4
Independently creates-- acceptable symbols	6	4
Independently creates-- exceptional symbols	<u>1</u>	1
	157	

SOCIAL DEVELOPMENT :

(a) FREQUENCY OF INTERACTION

Familiar adults	93%
Unfamiliar adults, speaking peers, non-speaking peers, young children	7%

(b) QUALITY OF MOST FREQUENT INTERACTION BETWEEN THE CHILD AND FAMILIAR ADULT

Description	No. of Children	% of Total
Attention seeking	19	12
Response when addressed	52	33
Initiates interaction	75	48
Total	146	

(c) FREQUENCY TABLE OF MOST FREQUENT INTERACTIVE BEHAVIOUR EMPLOYED BY CHILD

Description	No. of Children	% of Total
No score	32	20
Attention seeking	10	6
Responds when addressed	88	56
Initiates	27	17
Total	157	

PRESENT BEHAVIOUR AND PERSONALITY

(a) DEGREE OF FRUSTRATION EXPERIENCE EXPRESSED BY CHILD

Description	No. of Children	% of Total
Weak	36	24
Moderate	44	29
Strong	72	47
Total	152	

PRESENT BEHAVIOUR AND PERSONALITY :

(b) ATTITUDE TOWARD LEARNING NEW SYMBOLS

Description	No. of Children	% of Total
Actively rejects learning new symbols	6	4
No interest in learning new symbols	8	5
Can be directed toward learning new symbols	24	15
Shows interest in learning new symbols presented	76	48
Asks meaning of unknown symbols on display	17	11
Initiates request for learning new symbols	21	13
Initiates and independently directs search for new symbols	<u>5</u>	3
Total	157	

PRESENT EDUCATIONAL ACHIEVEMENT :

(a) READING LEVEL SCORES

Description	No. of Children	% of Total
4 - 10	5	4
11 - 19	9	6
20 - 31	39	27
32 - 40	33	23
41 - 49	26	18
50 - 60	16	11
61 - 67	8	5
71 - 80	<u>8</u>	6
Total	144	

LEVEL OF INTELLECTUAL FUNCTIONING :

(a) OBSERVED I.Q.

Description	No. of Children	% of Total
Severe	6	4
Moderate	30	19
Mild	29	19
Borderline	26	17
Low average	20	13
Average	33	21
High average	8	5
Superior	<u>2</u>	1
Total	154	

(b) ASSESSED I.Q.

Description	No. of Children	% of Total
Severe	20	15
Moderate	26	20
Mild	36	27
Borderline	18	14
Low average	11	8
Average	16	12
High average	<u>4</u>	3
Total	131	

(c) LEVEL OF ALERTNESS

Description	No. of Children	% of Total
No interest	1	1
Little interest	4	3
Some interest	62	39
Very alert	<u>90</u>	57
Total	157	

VISUAL AREA - Visual Acuity :

(a) INCIDENTS OF VISUAL PROBLEMS

Description	No. of Children	% of Total
Not stated	7	4
Yes, has problems	31	20
No problems	<u>119</u>	76
Total	157	

(b) CHILD'S ABILITY TO ATTEND TO VISUAL STIMULI

Description	No. of Children	% of Total
Not stated	9	6
Poor	6	4
Fair	31	20
Good	83	53
Excellent	<u>28</u>	18
Total	157	

(c) CAPACITY FOR VISUAL LEARNING

Description	No. of Children	% of Total
Not stated	7	4
Poor	7	4
Fair	37	24
Good	76	48
Excellent	<u>30</u>	19
Total	157	

(d) SMALLEST SIZE OF PICTURE WHICH CAN BE PERCEIVED BY CHILD

Description	No. of Children	% of Total
3 inches square	11	13
2 inches square	15	17
1 inch square	22	25
One-half inch square	<u>39</u>	45
Total	87	

VISUAL AREA - Visual Perception :

(a) NUMBER OF SHAPES WHICH CAN BE PERCEIVED BY CHILD

Description	No. of Children	% of Total
0	7	8
1 - 2	8	9
3 - 5	12	14
6 - 8	14	16
9+	<u>44</u>	52
Total	85	

(b) COMPLEXITY OF PICTURE WHICH CAN BE HANDLED BY CHILD

Description	No. of Children	% of Total
1 - 2 items	9	11
3 - 5 items	13	16
6 - 10 items	13	16
11 - 30 items	19	24
31+ items	<u>26</u>	32
Total	80	

(c) LARGEST GROUP OF SYMBOLS FROM WHICH CHILD CAN SELECT ONE

Description	No. of Children	% of Total
N.S.	13	8
1 - 5	13	8
6 - 15	7	4
16 - 30	11	7
31 - 50	11	7
51 - 99	17	11
100	28	18
200 partially covered	6	4
200	12	8
400 partially covered	5	3
400	<u>34</u>	22
Total	157	

(c) LEVEL OF CHILD'S CONCEPT OF COLOUR

Description	No. of Children	% of Total
No concept of colour differences	8	9
Has concept of colour differences	7	8
Can match colours	6	7
Can discriminate most colours	17	19
Can name most colours	<u>50</u>	57
Total	88	

AUDITORY AREA:

(a) HEARING DIAGNOSIS

Description	No. of Children	% of Total
Not stated	2	2
Severe hearing loss	4	4
Mild hearing loss	7	7
Normal hearing	<u>81</u>	86
Total	94	

(b) HEARING AID

Description	No. of Children	% of Total
Wears hearing aid	1	1
Has but does not wear	2	1
Does not have	<u>148</u>	98
Total	151	

(c) AUDITORY ATTENTION

Description	No. of Children	% of Total
Not stated	4	3
Poor	6	4
Fair	29	18
Good	87	55
Excellent	<u>31</u>	20
Total	157	

(d) CAPACITY FOR AUDITORY LEARNING

Description	No. of Children	% of Total
Not stated	9	6
Poor	6	4
Fair	36	23
Good	79	50
Excellent	<u>27</u>	17
Total	157	

MOBILITY :

(a) MOBILITY

Description	No. of Children	% of Total
No response	7	4
Dependent	88	56
Hand-operated wheel chair	18	11
Electric wheel chair	12	8
Walks with aid	15	10
Walks independently	<u>17</u>	11
Total	157	

HAND FUNCTION :

(a) ELECTRONIC EQUIPMENT REQUIREMENTS

Description	No. of Children	% of Total
Electronic equipment not required	99	64
Has electronic equipment	5	3
Requires but unavailable	40	26
Requires improved electronic equipment	1	1
Other	<u>18</u>	12
Total	163	

For many of the factors discussed in the preceding section, frequency tables are available which describe the total population at the beginning of the Study, as recorded in December 1974, and the variables relevant to the initial assessment.

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GENERAL DESCRIPTION OF THE
POPULATION AND SUB-POPULATION

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TABLES

Sex	Frequency	Cumulative Freq.	% of Pop.
Male	88	157	56
Female	69	69	44
Total	157	0	100%

Table 1: Sex

Residence	Frequency	Cumulative Freq.	% of Pop.
Home	108	157	69
Institution	48	49	31
Institution/home	1	1	1
Total	157	0	100%

Table 2: Residence

Age (in years)	Frequency	Cumulative Freq.	% of Pop.*
0-2	1	157	1
3-4	5	156	3
5-5	7	151	4
6-7	28	144	18
8-9	29	116	18
10-11	31	87	20
12-15	34	56	22
16-19	7	22	4
20-29	13	15	8
30+	2	22	1
Total	157	0	100%

Table 3: Age

*Note: All percentages given in tabular form, have been taken to the nearest whole number.

Diagnosis	Frequency	Cumulative Freq.	% of Pop.
Cerebral palsy	141	157	90
Brain injury	8	16	5
Other *	8	8	5
Total	157	0	100%

Table 4: Diagnosis

*(not mutually exclusive)

Lesch-Nyham Syndrome	Sickle Cell Anemia
Degenerative CNS	Epilepsy
Hydrocephalic	Deaf
Reyes Syndrome	Downs. Syndrome
	Pelizemus-Merzbacher

Mobility	Frequency	Cumulative Freq.	% of Pop.
Dependent in wheelchair	88	157	57
Hand-operated w-chair	18	69	11
Electric w-chair	12	51	8
Walks with aid	15	39	10
Walks independently	17	24	11
No response	7	7	4
Total	157	0	100%

Table 5 Mobility

Date Symbols Introduced	Frequency	Cumulative Freq.	% of Pop.
Feb. 75	4	157	3*
Dec. 74 - Jan. 75	19	153	12*
Sept. 74 - Nov. 74	39	134	25*
Sept. 73 - Aug. 74	65	95	41**
Sept. 72 - Aug. 73	19	30	12**
Oct. 71 - Aug. 72	11	11	7**
Total	157	0	100%

Table 6 Date Symbols were Introduced

*Inexperienced

**Experienced

Grade/Level	Frequency	Cumulative Freq.	% of Pop.
Program for the Retarded	49*	157	31
Pre-kindergarten	25	108	16
Kindergarten	25	83	16
Primary	28	58	18
Level/Grade 1	16	30	10
Level/Grade 2	4	14	3
Level/Grade 3	6	10	4
Level/Grade 4	1	4	1
Level/Grade 5	2	3	1
Advanced Elementary	1	1	1
Total	157	0	101%

Table 7 (a): Grade/Level on Introduction to Symbols
(Academic)

Grade/Level (Specified)	Frequency	Cumulative Freq.	% of Pop.
Academic	109*	157	69
Trainable Mentally Retarded	25	48	16
Opportunity Class	4	23	3
Not Applicable	19	19	12
Total	157	0	100%

Table 7 (b): Grade/Level Specified for Programme
for the Retarded

*Note: One person indicated that the child was in both an academic and retarded program.

Assessed I.Q.	Frequency	Cumulative Freq.	% of Pop.
Severely Retarded	20	131	15
Moderately Retarded	26	111	20
Mildly Retarded	36	85	27
Borderline	18	49	14
Low Average	11	31	8
Average	16	20	12
High Average	4	4	3
Superior	0	.0	0
Total	131	0	99%

Table 8: Assessed I.Q.

Observed I.Q.	Frequency	Cumulative Freq.	% of Pop.
Severely Retarded	6	154	4
Moderately Retarded	30	148	19
Mildly Retarded	29	118	19
Borderline	26	89	17
Low Average	20	63	13
Average	33	43	21
High Average	8	10	5
Superior	2	2	1
Total	154	0	99%

Table 9: Observed I.Q.

Level of Alertness	Frequency	Cumulative Freq.	% of Population
No Interest	1	157	1
Little Interest	4	156	3
Some Interest	62	152	39
Very Alert	90	90	57
Total	157	0	

Table 10: Level of Alertness

Assessed Language Comprehension Level	Frequency	Cumulative Freq.	% of Pop.
Grossly below age level	56	157	36
Two years below age level	42	101	27
At age level	19	59	12
Above age level	9	40	4
Not stated	31	31	20
Total	126	0	99%

Table 11: Assessed Language Comprehension Level

Speech Prognosis	Frequency	Cumulative Freq.	% of Pop.
Poor	112	157	71
Limited	20	45	13
Good	5	25	3
Not Stated	20	20	13
Total	157	0	100%

Table 12: Speech Prognosis

Substitute/Complement	Frequency	Cumulative Freq.	% of Pop.
Symbols Introduced and used as Substitute	114	155	74
Symbols Introduced and used as Complement	31	41	20
Symbols Introduced as Substitute and used as Complement	10	10	6
Symbols Introduced as Complement and used as Substitute	0	0	0
Total	155	0	100%

Table 13: The Relationship of Symbols to Speech

Speech Assessment	Frequency	Cumulative Freq.	% of Pop.
Not Stated/Never Assessed	17	157	11
Within last year	103	140	66
Between 1 & 2 years	18	37	11
Over 2-5 years	14	19	9
Over 5-10 years	4	5	3
Over 10 years	1	1	1
Total	157	0	101%

Table 14: Last Speech Assessment

Auditory Attention	Frequency	Cumulative Freq.	% of Population
Poor	6	157	4
Fair	29	151	18
Good	87	122	55
Excellent	31	35	20
Not Stated	4	4	3
Total	157	0	100%

Table 15: Auditory Attention

Capacity for Auditory Learning	Frequency	Cumulative Freq.	% of Population
Poor	6	157	4
Fair	36	151	23
Good	79	115	50
Excellent	27	36	17
Not Stated	9	9	6
Total	157	0	100%

Table 16: Capacity for Auditory Learning

Hearing Diagnosis	Frequency	Cumulative Freq.	% of Population
Severe hearing loss	4	94	4
Mild hearing loss	7	90	7
Normal hearing	81	83	86
Not stated	2	2	2
Total	94	0	99%

Table 17: Hearing Diagnosis

Capacity for Visual Learning	Frequency	Cumulative Freq.	% of Pop.
Poor	7	157	4
Fair	37	150	24
Good	76	113	48
Excellent	30	37	19
Not Stated	7	7	4
Total	157	0	99%

Table 18: Capacity for Visual Learning

Ability to Attend to Visual Stimuli	Frequency	Cumulative Freq.	% of Pop.
Poor	6	157	4
Fair	31	151	20
Good	83	120	53
Excellent	28	37	18
Not Stated	9	9	6
Total	157	0	101%

Table 19: Visual Attention

Incidence of Visual Problems	Frequency	Cumulative Freq.	% of Pop.
Yes, has problems	31	157	20
No problems	119	126	76
Not stated	7	7	4
Total	157	0	100%

Table 20: Incidence of Visual Problems

Frustration	Frequency	Cumulative Freq.	% of Pop.
Weak	36	152	24
Moderate	44	116	29
Strong	72	72	47
Total	152	0	100%

Table 21: Degree of Frustration

Sex	Frequency	Cumulative Freq.	% of Population
Male	60	111	54
Female	51	51	46
Total	111	0	100%

Table 22: Sex (Sub-population)

Residence	Frequency	Cumulative Freq.	% of Pop.
Home	89	111	80
Institution	22	22	20
Total	111	0	100%

Table 23: Residence (Sub-population)

Age (in years)	Frequency	Cumulative Freq.	% of Population
0-2	1	111	1
3-4	4	110	4
5-5	4	106	4
6-7	24	102	21
8-9	24	78	21
10-11	22	54	20
12-15	20	32	18
16-19	4	12	4
20-29	6	8	5
30+	1	2	1
Not stated	1	1	1
Total	111	0	100%

Table 24: Age (Sub-population)

Diagnosis	Frequency	Cumulative Freq.	% of Pop.
Cerebral Palsy	101	111	91
Brain Injury	6	10	5
Other	4	4	4
Total	111	0	100%

Table 25: Diagnosis (Sub-population)

Mobility	Frequency	Cumulative Freq.	% of Pop.
Walks Independently	16	111	14
Walks with Aid	15	95	13
Operates Electric W-Chair	6	80	5
Hand operates Wheelchair	9	74	8
Dependent in Wheelchair	59	65	54
Not States	6	6	5
Total	111	0	99%

Table 26: Mobility (Sub-population)

Date of Symbol- Introduction	Frequency	Cumulative Freq.	% of Pop.
Oct. 71 - Aug. 72	5	111	4
Sept. 72 - Aug. 73	16	106	14
Sept. 73 - Aug. 74	49	90	44
Sept. 74 - Nov. 30, 74	34	41	31
Dec. 74 - Jan. 31, 75	5	7	4
Feb. 75	2	2	2
Total	111	0	99%

Table 27: Date of Introduction to
Symbols (Sub-population)

Substitute/Complement	Frequency	Cumulative Freq.	% of Pop.
Symbols introduced and used as Substitute	88	111	79
Symbols introduced and used as Complement	16	23	14
Symbols introduced as Substitute and used as Complement	7	7	6
Symbols Introduced as Complement and used as Substitute	0	0	0
Total	111	0	99%

Table 28: The Relationship of Symbols to Speech (Sub-population)

Educational Placement	Frequency	Cumulative Freq.	% of Population
Academic	73	111	66
Opportunity	12	38	11
Retarded	19	26	17
No School	7	7	6
Total	111	0	100%

Table 29: Educational Placement (Sub-population)

Setting	Discipline (principal)	Total Disciplines Involved
Bloorview	Speech Pathologist	4
Centre for Exceptional Children	Psychologist	1
Erie County Health Centre	O.T.	7
Georgia Retardation Centre	Teacher	3
Joseph Kaeble	Teacher	1
Keith Bovenschen	Teacher	2
Lansdowne Children's Centre	Speech Therapist/Teacher	2
Kitchener-Waterloo Rotary	Teacher/ Speech Path.	7
MacKay Centre	Teacher	1
Miriam Home School	Teacher	2
Niagara Peninsula	Teacher/ Speech Path.	2
Northwestern University	Teacher	1
Ontario Crippled Children's	Teacher	17*
Ottawa Crippled Children's	Speech Therapist	2
Peter Hall School	Teacher	2
Rideau Regional	Teacher/Counsellor	4
Kingston Regional Centre	Teacher	1
Southwestern Regional	Teacher	1
Ellen Douglas School	Teacher	1
Smithson Public School	Teacher	1
Simon Cunningham	Teacher	1
Simcoe Hall	Speech Pathologist	2
Sarnia and District	Physio./Speech Path.	4
Victor Dore	O.T./Teacher	5
W.J. McCordic School	Teacher	1
United C.P.-Chicago	Teacher	1
U.C.P.A. -Western New York	Speech Pathologist	1
Villa Hospital School	Teacher	1
U.C.P. -Niagara	Speech Path./Teacher	3
Mary Free Bed	Speech Path./Teacher	4
Central Wisconsin	Speech Path./Teacher	4
		89

Table 30: Disciplines involved in symbol program

Mean= 2.8

*3 program not mutually exclusive disciplines

Experience	Frequency	Cumulative Freq.	% of Pop.
Less than 1 year	8	151	5
1-2 years	54	143	36
2-5 years	32	89	21
5-10 years	36	57	24
More than 10 years	21	21	14
Total	151	0	100%

Table 31: Number of Children in Programs Having Instructors with Specified Amount of Experience with Physically Handicapped Children

Experience	Frequency	Cumulative Freq.	% of Pop.
Less than 6 months	47	151	31
6 months - 1 year	28	104	19
1 year - 2 years	53	76	35
2 years - 3 years	9	23	6
More than 3 years	14	14	9
Total	151	0	100%

Table 32: Number of Children in Programs Having Instructors with Specified Amount of Experience in Teaching Symbols

Description	December 1974		December 1975	
	No. of Children	% of Total	No. of Children	% of Total
Not Indicated	11	7		
Own	67	43	26	22
O.C.C.C.	79	50	90	78
TOTAL	157		116	

Table 33: Display Type

Description	December 1974	December 1975
Yes/no	11%	9%
	89%	91%
Manners	39%	18%
	61%	82%
Questions	57%	30%
	43%	70%
People	17%	7%
	83%	93%
Actions	23%	7%
	77%	92%
Emotions	19%	8%
	81%	92%
Description words	44%	15%
	56%	85%
Things	12%	5%
	88%	95%

Table 34: Vocabulary Categories

<u>Nouns</u>	<u>Verbs</u>
79% ranked 1	11% ranked 1
5% ranked 2, 3 or 4	39% ranked 2
15% no answer	15% ranked 3
	10% ranked 4
	21% no answer
<u>Adjectives</u>	<u>Pronouns</u>
32% no answer	36% no answer
10% ranked 2	8% ranked 1
20% ranked 3	15% ranked 2
15% ranked 4	19% ranked 3
8% ranked 5	12% ranked 4
5% ranked 6	4% ranked 5

Table 35: Parts of Speech (Dec. 1974):
High Frequency of Use

<u>Auxiliary Verbs</u>	<u>Articles</u>
78% no answer	82% no answer
6% ranked 2, 3 or 4	10% ranked 7-9
6% ranked 5 or 6	
<u>Conjunctions</u>	<u>Adverbs</u>
82% no answer	65% no answer
11% ranked 8-10	14% ranked 5 or 6
<u>Wh. Questions</u>	<u>Negatives</u>
66% no answer	68% no answer
5% ranked 1, 3	16% ranked 4-6
13% ranked 5, 6	12% ranked 7-10
5% ranked 7	
7% ranked 8-10	
<u>Prepositions</u>	<u>Articles</u>
67% no answer	82% no answer
21% ranked 4-7	10% ranked 7-9
<u>Secondary Verbs</u>	<u>Noun Modifiers</u>
72% no answer	78% no answer
9% ranked 2-5	7% ranked 3-5
6% ranked 8-10	5% ranked 6, 7
5% ranked 12, 13	1% ranked 8
	9% ranked 9-12

Table 35: Parts of Speech (Dec. 1974):
Rarely Used

<u>Nouns</u>	<u>Adjectives</u>
2% no answer	9% no answer
87% ranked 1	11% ranked 1, 2
9% ranked 2, 3	53% ranked 3, 4
2% ranked 13, 14	16% ranked 5, 6
	11% ranked 7, 12
<u>Verbs</u>	<u>Pronouns</u>
5% no answer	13% no answer
10% ranked 1	71% ranked 1, 4
58% ranked 2	14% ranked 5, 7
23% ranked 3	1% ranked 10
3% ranked 12, 14	

Table 36: Parts of Speech (Dec. 1975):
High Frequency of Use

<u>Auxiliary Verbs</u>	<u>Negatives</u>
54% no answer	36% no answer
25% ranked 2, 7	12% ranked 1-5
19% ranked 8, 14	40% ranked 6-9
	12% ranked 10-14
<u>Adverbs</u>	<u>Secondary Verbs</u>
47% no answer	53% no answer
27% ranked 1, 7	25% ranked 2-7
25% ranked 8, 14	20% ranked 8-13
<u>Prepositions</u>	<u>Noun Modifiers</u>
25% no answer	55% no answer
8% ranked 1, 3	25% ranked 3-8
44% ranked 4, 7	19% ranked 9-14
21% ranked 8, 13	
<u>Conjunctions</u>	<u>Wh. Questions</u>
63% no response	33% no answer
25% ranked 2, 9	11% ranked 1-4
12% ranked 10-13	32% ranked 5-7
	23% ranked 8-14
<u>Articles</u>	
64% no answer	
27% ranked 2-9	
7% ranked 10-14	

Table 36: Parts of Speech (Dec. 1975):
Moderately Used

APPENDIX 4(b) TABLES 1 - 4

FREQUENCY DISTRIBUTION OF SUBJECTS
BY AGE, I.Q., EXPERIENCE AND DISABILITY

page 146

FREQUENCY DISTRIBUTION OF SUBJECTS

Table 1

For C.Age by I.Q. (1974 and 1975)

		C.AGE			
		2-5 yrs.	6-11 yrs.	12-15 yrs.	16+ yrs.
I.Q.	Retarded	5	31	40	51
	Non-retarded	7	25	24	7

Chi-square = 2.89

d.f. = 8

p = 0.941

Table 2

For C.Age by Experience (1974 and 1975)

		C.AGE			
		2-5 yrs.	6-11 yrs.	12-15 yrs.	16+ yrs.
EXP	Inexperienced	8	21	26	7
	Experienced	5	36	39	15

Chi-square = 3.36

d.f. = 3

p. = 0.909

Table 3

For Experience by I.Q. (1974 and 1975)

		EXP	
		Inexperienced	Experienced
I.Q.	Retarded	41	21
	Non-retarded	50	42

Chi-square = 2.13

d.f. = 4

p. = 0.713

Table 4

For Disability by Experience (1974 and 1975)

		DISAB		
		Severe	Medium	Mild
EXP	Inexperienced	20	26	16
	Experienced	38	43	13

Chi-square = 3.68

d.f. = 6

p. = 0.720

APPENDIX 4(c) TABLES 1 - 7

MEAN SCORES (1974)

pages 147 - 148

MEAN SCORES

FOR C.AGE BY I.Q. (1974):

Table 1

NUMBER OF PLAY MATERIALS

		Age			
		0-5	6-11	12-15	16+
I.Q.	Retarded	2.40	2.84	2.20	1.07
	Non-retarded	4.29	1.76	1.25	0.43

Table 2

INCORPORATION OF SYMBOLS INTO PLAY MATERIAL

		Age			
		0-5	6-11	12-15	16+
I.Q.	Retarded	0.80	2.55	1.70	0.67
	Non-Retarded	4.14	1.64	1.25	0.43

Table 3

READING SCORE

		Age			
		0-5	6-11	12-15	16+
I.Q.	Retarded	12.80	28.06	36.58	50.73
	Non-retarded	26.43	40.30	52.91	43.67

Table 4

NUMBER OF SYMBOLS IN BEST SENTENCE

		Age		
		0-11	12-15	16+
I.Q.	Retarded	4.10	4.54	5.00
	Non-retarded	5.31	6.58	10.57

Table 5

NUMBER OF SYMBOLS IN TYPICAL SENTENCE

		Age		
		0-11	12-15	16+
I.Q.	Retarded	2.40	2.77	2.33
	Non-retarded	3.25	4.17	6.71

Table 6

INTEREST IN CREATING NEW SYMBOLS

		Age			
		0-5	6-11	12-15	16+
I.Q.	Retarded	0.00	0.10	0.67	0.47
	Non-retarded	0.00	0.76	2.08	3.86

Table 7

MEANS OF COMMUNICATION

		EXP	
		Inexperienced	Experienced
I.Q.	Retarded	1.44	1.68
	Non-retarded	1.29	2.10

APPENDIX 5

T-VALUES FOR TOTAL AND RETARDED POPULATION

pages 149 - 152

List of variable names appearing on the following page:

1	OBSIQ	<i>Observed I.Q.</i>
2	ALERT	<i>Alertness</i>
3	SPROGN	<i>Speech prognosis</i>
4	OBLANCO	<i>Observed language comprehension</i>
5	COMIN	<i>Interest in communication</i>
6	VRANGE	<i>Number of symbols related to</i>
7	VISAT	<i>Visual attention</i>
8	SYMIN	<i>Integration of symbol communication</i>
9	ATTNUS	<i>Attitude to learning new symbols</i>
10	LATALL	<i>Language arts time</i>
11	TALL	<i>Largest time allocation</i>
12	AREA	<i>Area of largest time allocation</i>
13	LISTAL	<i>Time for listening</i>
14	COMAL	<i>Time for communication</i>
15	READAL	<i>Time for reading</i>
16	WRITAL	<i>Time for writing</i>
17	SYUSE	<i>Integration into reading activities</i>
18	LEVSC	<i>Reading score</i>
19	HIVMAT	<i>Highest visual level</i>
20	PLMAT	<i>Number of play materials</i>
21	PLINCOR	<i>Incorporation of symbols into play material</i>
22	PICTSIZ	<i>Smallest picture size</i>
23	COLCON	<i>Colour concept</i>
24	NRSHA	<i>Ability to select one shape from many</i>
25	PICTCPL	<i>Ability to select one picture from many</i>
26	INSTFR	<i>Reading instruction</i>
27	SYMINT	<i>Integration of symbols into reading material</i>
28	REAPROF	<i>Reading proficiency</i>
29	BEHFR	<i>Nature of social interaction</i>
30	SETFR	<i>Number of settings</i>
31	MEACOM	<i>Means of communication</i>
32	NRSYM	<i>Number of symbols</i>
33	WORKVOC	<i>Working vocabulary</i>
34	KNOWVOC	<i>Known vocabulary</i>

35	SYMSKILL	<i>Skill in symbols</i>
36	NRSKILL	<i>Skill areas</i>
37	HISKILL	<i>Highest skill area</i>
38	SPROSKIL	<i>Proficiency with symbols</i>
39	STRESCOM	<i>Ability to deal with listener's misunderstanding</i>
40	TEAMOD	<i>Syntax model presented</i>
41	CHIMOD	<i>Child's sentence order</i>
42	NRSTAT	<i>Types of statements</i>
43	NSYMBEST	<i>Number of symbols in best sentence</i>
44	NSYMTYP	<i>Number of symbols in typical sentence</i>
45	CRNSYM	<i>Ability/Interest in creating symbols</i>
46	LEARN	<i>Speed of learning symbols</i>
47	VERBCOM	<i>Highest level of verbal communication</i>
48	LCOMPR	<i>Assessed language comprehension</i>
49	SPTHFR	<i>Speech therapy</i>

Table of t-values for Total and Retarded Population,
Resulting from Significance Tests of 1975-1974 Scores

		Total Population			Retarded Population		
Variable		t-values	n	p	t-values	n	p
1	OBSIQ	2.129	108	n.s.	3.196	63	p<.005
2	ALERT	1.553	114	n.s.	2.008	63	p<.05
3	SPROGN	1.181	126	n.s.	1.062	71	n.s.
4	OBLANCO	-1.713	78	p<.05	-2.101	43	p<.05
5	COMIN	2.797	123	p<.005	2.338	71	p<.05
6	VRANGE	8.364	125	p<.001	6.671	71	p<.001
7	VISAT	1.324	125	n.s.	0.748	71	n.s.
8	SYMIN	5.144	119	p<.001	4.823	69	p<.001
9	ATTNUS	4.384	119	p<.001	3.724	69	p<.001
10	LATALL	0.938	105	n.s.	2.059	59	p<.05
11	TALL	0.283	107	n.s.	1.929	60	n.s.
12	AREA	-3.636	119	p<.001	-3.252	67	p<.001
13	LISTAL	-1.171	120	n.s.	-0.308	67	n.s.
14	COMAL	-1.382	120	n.s.	-0.870	67	n.s.
15	READAL	3.334	120	p<.001	2.941	67	p<.005
16	WRITAL	3.657	120	p<.001	2.328	67	p<.05
17	SYUSE	6.222	120	p<.001	5.638	67	p<.001
18	LEVSC	9.236	108	p<.001	6.813	63	p<.001
19	HIVMAT	1.347	120	n.s.	1.209	69	n.s.
20	PLMAT	0.867	120	n.s.	0.820	69	n.s.
21	PLINCOR	0.712	120	n.s.	1.230	69	n.s.
22	PICTSI2	-0.087	56	n.s.	0.665	34	n.s.
23	COLCON	4.800	57	p<.001	4.018	35	p<.001
24	NRSHA	4.957	56	p<.001	4.000	35	p<.001
25	PICTCPL	5.755	50	p<.001	5.677	31	p<.001
26	INSTFR	1.410	45	n.s.	1.417	23	n.s.
27	SYMINT	4.800	119	p<.001	4.510	68	p<.001
28	REAPROF	4.638	46	p<.001	2.849	24	p<.005
29	BEHFR	4.810	121	p<.001	2.678	69	p<.005

Variable	Total Population			Retarded Population		
	t-values	n	p	t-values	n	p
30 SETFR	6.665	121	p<.001	5.844	69	p<.001
31 MFACOM	5.119	114	p<.001	4.552	63	p<.001
32 HRSYM	10.318	116	p<.001	8.150	65	p<.001
33 WORKVOC	6.746	102	p<.001	4.905	54	p<.001
34 KNOWVOC	4.303	102	p<.001	3.539	54	p<.001
35 SYMSKILL	12.874	116	p<.001	11.737	65	p<.001
36 NRSKILL	8.438	116	p<.001	8.815	65	p<.001
37 HISKILL	8.368	116	p<.001	7.892	65	p<.001
38 SPROSKIL	11.148	108	p<.001	8.970	60	p<.001
39 STRESCOM	8.622	120	p<.001	6.370	69	p<.001
40 TEAMOD	4.155	116	p<.001	2.339	65	p<.001
41 CHIMOD	3.714	116	p<.001	2.717	65	p<.005
42 NRSTAT	4.292	68	p<.001	4.541	37	p<.001
43 NSYMBEST	5.638	93	p<.001	5.093	48	p<.001
44 NSYMTYP	6.845	93	p<.001	5.834	48	p<.001
45 CRNSYM	7.144	114	p<.001	5.193	65	p<.001
46 LEARN	0.339	113	n.s.	1.751	63	n.s.
47 VERBCOM	6.440	113	p<.001	5.265	63	p<.001
48 LCOMPR	-2.295	25	p<.05	-1.000	14	n.s.
49 SPTHFR	-0.370	117	n.s.	-0.363	67	n.s.

APPENDIX 6 (a) TABLES 1 - 24: 1974

TABLES 25 - 46: 1975

ANALYSIS OF VARIANCE OF I.Q. BY C.AGE

(INTELLIGENCE BY CODED AGE)

pages 153 - 168

SUMMARY TABLES OF ANALYSIS OF VARIANCE OF I.O.
BY C.AGE (INTELLIGENCE BY CODED AGE) FOR 1974 DATA

Table 1 Alertness Level (ALERT)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1.85	1	1.85	6.14	0.014
C.AGE	2.09	3	0.70	2.32	0.078
I.Q. by C.AGE	0.75	3	0.25	0.83	0.479
Error	43.88	146	0.30		

Table 2 Frustration Experienced in Communication (FRUST)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	0.45	1	0.45	0.69	0.409
C.AGE	0.69	3	0.23	0.35	0.789
I.Q. by C.AGE	3.27	3	1.09	1.65	0.180
Error	93.69	142	0.66		

Table 3 Symbol Integration into Other Areas (SYMIN)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	31.45	1	31.45	12.53	0.001
C.AGE	104.22	3	34.74	13.84	0.0001
I.Q. by C.AGE	6.27	3	2.09	0.83	0.478
Error	366.54	146	2.51		

1974 Data (cont'd)

Table 4 Attitude Toward Learning New Symbols (ATTNUS)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	37.32	1	37.32	31.51	0.0001
C.AGE	74.85	3	24.95	21.06	0.0001
I.Q. by C.AGE	8.25	3	2.75	2.32	0.078
Error	172.95	146	1.18		

Table 5 Time Allocated to Listening Activities (LISTAL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	11.07	1	11.07	2.23	0.138
C.AGE	66.41	3	22.14	4.46	0.005
I.Q. by C.AGE	12.28	3	4.09	0.82	0.482
Error	725.04	146	4.97		

Table 6 Time Allocated to Communication Activities (COMAL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1.64	1	1.64	0.32	0.571
C.AGE	50.84	3	16.95	3.33	0.021
I.Q. by C.AGE	11.18	3	3.73	0.73	0.534
Error	743.31	146	5.09		

1974 Data (cont'd)

Table 7 Time Allocated to Reading Activities (READAL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	5.84	1	5.84	2.79	0.097
C.AGE	40.94	3	13.65	6.52	0.0001
I.Q. by C.AGE	4.49	3	1.50	0.71	0.545
Error	305.72	146	2.09		

Table 8 Total Score with Regard to Academic Level (LEVSC)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1353.30	1	1353.30	7.43	0.007
C.AGE	8290.77	3	2763.59	15.17	0.0001
I.Q. by C.AGE	1505.20	3	501.73	2.75	0.045
Error	24231.18	133	182.19		

Table 9 Play Materials Utilized by Child for
"Symbol Readiness" (PLMAT)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	0.88	1	0.88	0.24	0.622
C.AGE	81.79	3	27.26	7.55	0.0001
I.Q. by C.AGE	34.00	3	11.33	3.14	0.027
Error	526.93	146	3.61		

1974 Data (cont'd)

Table 10 Degree of Incorporation of Symbols into Play Materials (PLINCOR)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	4.41	1	4.41	0.97	0.325
C.AGE	49.02	3	16.34	3.61	0.015
I.Q. by C.AGE	66.52	3	22.17	4.90	0.003
Error	661.04	146	4.53		

Table 11 Most Frequent Behavior (BEHFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	0.20	1	0.20	0.22	0.643
C.AGE	7.16	3	2.39	2.53	0.059
I.Q. by C.AGE	1.28	3	0.43	0.45	0.716
Error	137.51	146	0.94		

Table 12 Number of Settings Where Symbol Communication Used (SETFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	35.19	1	35.19	8.70	0.004
C.AGE	73.64	3	24.55	6.06	0.001
I.Q. by C.AGE	2.70	3	0.90	0.22	0.881
Error	590.91	146	4.05		

1974 Data (cont'd)

Table 13 Means of Communication (MEACOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	2.57	1	2.57	3.89	0.050
C.AGE	11.54	3	3.85	5.83	0.001
I.Q. by C.AGE	4.61	3	1.54	2.33	0.077
Error	96.39	146	0.66		

Table 14 Subjects Skill with Symbols (SYMSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	10129.25	1	10129.25	42.62	0.0001
C.AGE	22321.21	3	7440.40	31.30	0.0001
I.Q. by C.AGE	3451.98	3	1150.66	4.84	0.003
Error	34702.21	146	237.69		

Table 15 Number of Skills Attained with Regard to Skill with Symbols (IRSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	150.96	1	150.96	34.80	0.0001
C.AGE	150.24	3	50.08	11.54	0.0001
I.Q. by C.AGE	3.28	3	1.09	0.25	0.860
Error	633.36	146	4.34		

1974 Data (cont'd)

Table 16 Highest Skill Attained with Regard to Skill with Symbols (HISKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	154.35	1	154.35	29.80	0.0001
C.AGE	192.84	3	64.28	12.41	0.0001
I.Q. by C.AGE	3.71	3	1.24	0.24	0.869
Error	756.13	146	5.18		

Table 17 Sum of Proficiency Scores with Regard to Skill with Symbols (SPROSKIL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1280.47	1	1280.47	39.73	0.0001
C.AGE	1728.56	3	576.19	17.88	0.0001
I.Q. by C.AGE	143.22	3	47.74	1.48	0.222
Error	4383.23	136	32.23		

Table 18 Number of Symbols in Child's Best Sentence (NSYMEST)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	205.84	1	205.84	20.09	0.0001
C.AGE	160.46	2	80.23	7.83	0.001
I.Q. by C.AGE	84.87	2	42.44	4.14	0.018
Error	1250.25	122	10.25		

1974 Data (cont'd)

Table 19 Number of Symbols in Child's Typical Sentence
(NSYMTYP)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	114.89	1	114.89	32.24	0.0001
C.AGE	46.19	2	23.10	6.48	0.002
I.Q. by C.AGE	56.73	2	28.37	7.96	0.001
Error	427.65	120	3.56		

Table 20 Ability to Create New Symbols (CRNSYM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	43.16	1	43.16	39.26	0.0001
C.AGE	65.27	3	21.76	19.89	0.0001
I.Q. by C.AGE	37.38	3	12.46	11.34	0.0001
Error	160.47	146	1.10		

Table 21 Ability to Learn New Symbols (LEARN)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	20.11	1	20.11	18.31	0.0001
C.AGE	27.29	3	9.10	8.28	0.0001
I.Q. by C.AGE	0.43	3	0.14	0.13	0.943
Error	160.37	146	1.10		

1974 Data (cont'd)

Table 22 Verbal Communication (VERBCOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1.18	1	1.18	2.57	0.452
C.AGE	19.31	3	3.44	1.66	0.177
I.Q. by C.AGE	6.21	3	2.07	1.00	0.394
Error	301.62	146	2.07		

Table 23 Ability to Deal with Listener's Misunderstanding (STRESCOM)

Source of Variance	S.S.	d.f.	M.S.	F	P
I.Q.	20.75	1	20.75	10.42	0.002
C.AGE	88.57	3	29.52	14.82	0.001
I.Q. by C.AGE	4.91	3	1.64	0.82	0.484
Error	290.81	146	1.99		

Table 24 Interest in Communication (COMIN)

Source of Variance	S.S.	d.f.	M.S.	F	P
I.Q.	6.24	1	6.24	13.78	0.0001
C.AGE	1.99	3	.66	1.46	0.227
I.Q. by C.AGE	3.00	3	1.00	2.21	0.090
Error	65.61	145	0.45		

SUMMARY TABLES OF ANALYSIS OF VARIANCE OF I.Q. BY
C.AGE (INTELLIGENCE BY CODED AGE) FOR 1975 DATA

Table 25 Alertness Level (ALERT)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	0.41	1	0.41	1.22	0.273
C.AGE	0.83	2	0.41	1.23	0.295
I.Q. by C.AGE	0.26	2	0.13	0.39	0.680
Error	35.28	105	0.34		

Table 26 Interest in Communication (COMIN)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1.34	1	1.34	4.17	0.044
C.AGE	0.90	3	0.30	0.93	0.427
I.Q. by C.AGE	0.68	3	0.23	0.70	0.555
Error	36.09	112	0.32		

Table 27 Symbol Integration into Other Areas (SYMIN)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1.09	1	1.09	0.35	0.554
C.AGE	1.35	2	0.68	0.22	0.804
I.Q. by C.AGE	9.28	2	4.64	1.50	0.228
Error	340.40	110	3.09		

1975 Data (cont'd)

Table 28 Attitude Toward Learning New Symbols (ATTNUS)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	15.84	1	15.84	8.02	0.005
C.AGE	12.50	2	6.25	3.17	0.046
I.Q. by C.AGE	10.15	2	5.07	2.57	0.081
Error	217.08	110	1.97		

Table 29 Time Allocated to Language Arts (LATALL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	0.00	1	0.00	0.00	0.989
C.AGE	46.30	2	23.15	6.62	0.002
I.Q. by C.AGE	1.06	2	0.53	0.15	0.859
Error	384.82	110	3.50		

Table 30 Time Allocated to Development of
Listening Skills (LISTAL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	23.68	1	23.68	6.77	0.011
C.AGE	20.15	2	10.08	2.88	0.060
I.Q. by C.AGE	1.18	2	0.59	0.17	0.845
Error	388.02	111	3.50		

1975 Data (cont'd)

Table 31 Time Allocated to Communication (COMAL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.O.	2.28	1	2.28	0.81	0.370
C.AGE	86.43	2	43.21	15.32	0.0001
I.O. by C.AGE	2.13	2	1.07	0.38	0.686
Error	313.19	111	2.82		

Table 32 Time Allocated to Reading Activities (READAL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.O.	3.34	1	3.34	1.63	0.204
C.AGE	23.09	2	11.54	5.63	0.005
I.O. by C.AGE	1.50	2	0.75	0.37	0.694
Error	227.77	111	2.05		

Table 33 Total Score with Regard to Academic Level (LEVSC)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.O.	248.36	1	248.36	1.19	0.278
C.AGE	1598.42	2	799.21	3.82	0.025
I.O. by C.AGE	2196.07	2	1098.03	5.25	0.007
Error	22172.37	106	209.17		

1975 Data (cont'd)

Table 34 Most Frequent Behavior (BEHFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	0.30	1	0.30	0.32	0.575
C.AGE	1.22	2	0.61	0.65	0.525
I.Q. by C.AGE	0.96	2	0.48	0.51	0.604
Error	105.55	112	0.94		

Table 35 Number of Settings Where Symbol Communication Used (SETFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	10.15	1	10.15	1.82	0.181
C.AGE	16.41	2	8.21	1.47	0.235
I.Q. by C.AGE	6.67	2	3.33	0.60	0.553
Error	626.28	112	5.59		

Table 36 Means of Communication (MEACOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1.52	1	1.52	2.00	0.161
C.AGE	2.99	2	1.50	1.97	0.145
I.Q. by C.AGE	0.47	2	0.24	0.31	0.734
Error	79.92	105	0.76		

1975 Data (cont'd)

Table 37 Subject's Skill with Symbols (SYMSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	6906.78	1	6906.78	16.62	0.0001
C.AGE	7599.04	2	3799.52	9.14	0.0001
I.Q. by C.AGE	725.28	2	363.64	0.87	0.421
Error	44464.27	107	415.55		

Table 38 Total Number of Skills Attained with Regard to Skill with Symbols (NRSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	39.09	1	39.09	9.85	0.002
C.AGE	47.42	2	23.71	5.97	0.003
I.Q. by C.AGE	0.66	2	0.33	0.08	0.921
Error	424.64	107	3.97		

Table 39 Highest Skill Attained with Regard to Skill with Symbols (HISKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	31.35	1	31.35	8.14	0.005
C.AGE	35.08	2	17.54	4.55	0.013
I.Q. by C.AGE	2.67	2	1.34	0.35	0.708
Error	412.23	107	3.85		

1975 Data (cont'd)

Table 40 Sum of Proficiency Scores with Regard
to Skill with Symbols (SPROSKIL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	960.79	1	960.79	20.94	0.0001
C.AGE	799.26	2	399.63	8.71	0.0001
I.Q. by C.AGE	40.80	2	20.40	0.44	0.642
Error	4818.27	105	45.89		

Table 41 Communication Under Stress, i.e. When
Meaning is not Understood (STRESCOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	17.52	1	17.52	7.18	0.008
C.AGE	23.27	2	11.63	4.77	0.010
I.Q. by C.AGE	0.23	2	0.11	0.05	0.955
Error	270.80	111	2.44		

Table 42 Number of Symbols in Child's
Best Sentence (NSYMBEST)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	101.56	1	101.56	6.20	0.014
C.AGE	64.85	2	32.42	1.98	0.143
I.Q. by C.AGE	31.30	2	15.65	0.96	0.388
Error	1669.69	102	16.37		

1975 Data (cont'd)

Table 43 Number of Symbols Used in Child's
Typical Sentence (NSYMTYP)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	54.79	1	54.79	7.67	0.007
C.AGE	68.04	2	34.02	4.77	0.011
I.Q. by C.AGE	5.37	2	2.68	0.38	0.688
Error	728.20	102	7.14		

Table 44 Ability to Create New Symbols (CRNSYM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	73.65	1	73.65	31.36	0.0001
C.AGE	18.40	2	9.20	3.92	0.023
I.Q. by C.AGE	10.14	2	5.07	2.16	0.121
Error	246.62	105	2.35		

Table 45 Ability to Learn New Symbols (LEARN)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	2.44	1	2.44	2.11	0.149
C.AGE	1.59	2	0.80	0.69	0.505
I.Q. by C.AGE	0.42	2	0.21	0.18	0.835
Error	120.49	104	1.16		

1975 Data (cont'd)

Table 46 Verbal Communication (VERBCOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.O.	5.36	1	5.36	2.38	0.126
C.AGE	2.79	2	1.39	0.62	0.540
I.O. by C.AGE	7.39	2	3.69	1.64	0.199
Error	234.03	104	2.25		

APPENDIX 6 (b) TABLES 1 - 3: 1974

TABLES 4 - 5: 1975

ANALYSIS OF VARIANCE OF C.AGE BY EXP

(CODED AGE BY EXPERIENCE)

pages 169 - 170

SUMMARY TABLES OF ANALYSIS OF VARIANCE OF C.AGE
BY EXP (CODED AGE BY EXPERIENCE) FOR 1974 DATA

Table 1 Degree of Frustration Experienced in
Communicating (FRUST)

Source of Variance	S.S.	d.f.	M.S.	F	p
C.AGE	0.36	3	0.12	0.18	0.909
EXP	0.13	1	0.13	0.20	0.657
C.AGE by EXP	2.84	3	0.95	1.45	0.230
Error	94.04	144	0.65		

Table 2 Means of Communication (MEACOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
C.AGE	5.12	3	1.71	2.61	0.054
EXP	5.58	1	5.58	8.54	0.004
C.AGE by EXP	0.36	3	0.12	0.18	0.908
Error	97.35	149	0.65		

Table 3 Communication Under Stress, i.e. When
Message is not Understood (STRESCOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
C.AGE	73.29	3	24.43	11.16	0.000
EXP	3.86	1	3.86	1.77	0.186
C.AGE by EXP	17.05	3	5.68	2.60	0.055
Error	326.25	149	2.19		

Summary Tables of Analysis of Variance of C.AGE
by EXP (Coded Age by Experience) for 1975 Data

Table 4 Means of Communication (MEACOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
C.AGE	1.93	3	0.64	0.87	0.457
EXP	1.71	1	1.71	2.32	0.131
C.AGE by EXP	1.53	3	0.51	0.69	0.558
Error	78.12	106	0.74		

Table 5 Communication Under Stress, i.e. When
Message Not Understood (STRESCOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
C.AGE	32.46	3	10.82	4.35	0.006
EXP	1.20	1	1.20	0.48	0.488
C.AGE by EXP	12.91	3	4.30	1.73	0.165
Error	278.48	112	2.49		

APPENDIX 6 (c) TABLES 1 - 3: 1974

TABLES 4 - 15: 1975

ANALYSIS OF VARIANCE OF I.Q. BY EXP

(INTELLIGENCE BY EXPERIENCE)

pages 171 - 175

SUMMARY TABLES OF ANALYSIS OF VARIANCE OF I.Q. BY
EXP (INTELLIGENCE BY EXPERIENCE) FOR 1974 DATA

Table 1 Interest in Communicating (COMIN)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	5.02	1	5.02	10.57	0.001
EXP	0.00	1	0.00	0.00	0.947
I.Q. by EXP	0.00	1	0.00	0.01	0.941
Error	70.77	149	0.47		

Table 2 Means of Communication (MEACOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	0.59	1	0.59	0.92	0.340
EXP	9.53	1	9.53	14.75	0.000
I.Q. by EXP	2.79	1	2.79	4.32	0.039
Error	96.88	150	0.65		

Table 3 Ability to Create New Symbols (CRNSYM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	33.12	1	33.12	21.70	0.000
EXP	13.91	1	13.91	9.11	0.003
I.Q. by EXP	2.99	1	2.99	1.96	0.164
Error	228.99	150	1.53		

SUMMARY TABLES OF ANALYSIS OF VARIANCE OF I.Q. BY
EXP (INTELLIGENCE BY EXPERIENCE) FOR 1975 DATA

Table 4 Interest in Communication (COMIN)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1.03	1	1.03	3.13	0.080
EXP	0.14	1	0.14	0.41	0.522
I.Q. by EXP	0.02	1	0.02	0.06	0.808
Error	38.17	116	0.33		

Table 5 Symbol Integration into Other Areas (SYMIN)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	5.26	1	5.26	1.69	0.197
EXP	2.08	1	2.08	0.67	0.416
I.Q. by EXP	0.00	1	0.00	0.00	0.980
Error	349.06	112	3.12		

Table 6 Most Frequent Behavior (BEHFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	1.28	1	1.28	1.39	0.240
EXP	3.41	1	3.41	3.70	0.057
I.Q. by EXP	0.07	1	0.07	0.08	0.781
Error	105.09	114	0.92		

1975 Data (cont'd)

Table 7
Number of Settings Where Symbol
Communication Used (SETFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	8.41	1	8.41	1.48	0.226
EXP	2.39	1	2.39	0.42	0.518
I.Q. by EXP	9.30	1	9.30	1.64	0.203
Error	646.61	114	5.67		

Table 8
Means of Communication (MEACOM)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	0.40	1	0.40	0.54	0.464
EXP	3.26	1	3.26	4.40	0.038
I.Q. by EXP	0.21	1	0.21	0.29	0.593
Error	79.26	107	0.74		

Table 9
Skill with Symbols (SYMSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	3314.02	1	3314.02	7.11	0.009
EXP	807.85	1	807.85	1.73	0.191
I.Q. by EXP	417.02	1	417.02	0.89	0.346
Error	50823.63	109	466.27		

1975 Data (cont'd)

Table 10 Total Number of Skills Attained with Regard to Skill with Symbols (NRSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	27.92	1	27.92	6.31	0.013
EXP	5.95	1	5.95	1.34	0.249
I.Q. by EXP	0.33	1	0.33	0.07	0.787
Error	482.25	109	4.42		

Table 11 Highest Skill Achieved by the Child with Regard to Skill with Symbols (HISKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	27.05	1	27.05	6.59	0.012
EXP	11.62	1	11.62	2.83	0.095
I.Q. by EXP	1.13	1	1.13	0.28	0.600
Error	447.12	109	4.10		

Table 12 Sum of Proficiency Scores with Regard to Skill with Symbols (SPROSKIL)

Source of Variance	S.S.	d.f.	M.S.	F	p
I.Q.	607.32	1	607.32	11.81	0.001
EXP	37.71	1	37.71	0.73	0.394
I.Q. by EXP	59.84	1	59.84	1.16	0.283
Error	5502.93	107	51.43		

1975 Data (con't)

Table 13 Communication Under Stress, i.e. when message not Understood (STRESCOM)

Source of Variance	S.S.	d.f.	M.S.	F	P
I.Q.	11.11	1	11.11	4.28	0.041
Experience	3.32	1	3.32	1.28	0.261
I.Q. by Experience	1.21	1	1.21	0.46	0.497
Error	293.66	113	2.60		

Table 14 Ability to Create New Symbols (CRNSYM)

Source of Variance	S.S.	d.f.	M.S.	F	P
I.Q.	50.22	1	50.22	19.59	0.0001
Experience	2.58	1	2.58	1.01	0.318
I.Q. by Experience	1.53	1	1.53	0.60	0.441
Error	274.35	107	2.56		

Table 15 Verbal Communication (VERBCOM)

Source of Variance	S.S.	d.f.	M.S.	F	P
I.Q.	4.83	1	4.83	2.13	0.147
Experience	1.43	1	1.43	0.63	0.429
I.Q. by Experience	4.17	1	4.17	1.84	0.177
Error	239.75	106	2.26		

APPENDIX 6 (d) TABLES 1 - 10: 1974

TABLES 11 - 20: 1975

ANALYSIS OF VARIANCE OF DISAB BY EXP

(DISABILITY BY EXPERIENCE)

pages 176 - 183

SUMMARY TABLES OF ANALYSIS OF VARIANCE OF DISAB
BY EXP (DISABILITY BY EXPERIENCE) FOR 1974 DATA

Table 1 Symbol Integration into Child's World (SYMIN)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	30.11	2	15.06	5.57	0.005
EXP	39.24	1	39.24	14.51	0.000
DISAB by EXP	2.07	2	1.03	0.38	0.683
Error	405.69	150	2.70		

Table 2 Child's Attitude Toward Learning New Symbols (ATTNUS)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	3.48	2	1.74	1.11	0.331
EXP	13.40	1	13.40	8.57	0.004
DISAB by EXP	2.21	2	1.10	0.71	0.495
Error	234.38	150	1.56		

Table 3 Most Frequent Behavior Displayed by Child (BEHFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	2.76	2	1.38	1.44	0.239
EXP	1.47	1	1.47	1.54	0.216
DISAB by EXP	0.32	2	0.16	0.17	0.847
Error	143.13	150	0.95		

1974 Data (cont'd)

Table 4 Setting Where Child Uses Symbol Communication (SETFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	37.45	2	18.73	5.04	0.008
EXP	58.00	1	58.00	15.61	0.000
DISAB by EXP	1.31	2	0.65	0.18	0.839
Error	557.30	150	3.72		

Table 5 Child's Skill with Symbols (SYMSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	3205.74	2	1602.87	4.64	0.011
EXP	4204.72	1	4204.72	12.18	0.001
DISAB by EXP	1728.15	2	864.07	2.50	0.085
Error	51778.65	150	345.19		

Table 6 Total Number of Skills Achieved by the Child (NRSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	30.97	2	15.49	2.75	0.067
EXP	31.74	1	31.74	5.63	0.019
DISAB by EXP	8.01	2	4.00	0.71	0.493
Error	846.02	150	5.64		

1974 Data (cont'd)

Table 7 Highest Skill Area Attained with Regard to the Child's Skill with Symbols (HISKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	46.80	2	23.40	3.90	0.022
EXP	83.07	1	83.07	13.85	0.000
DISAB by EXP	14.94	2	7.47	1.25	0.291
Error	899.48	150	6.00		

Table 8 Sum of Proficiency Scores with Regard to the Child's Skill with Symbols (SPROSKIL)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	331.91	2	165.96	3.61	0.030
EXP	206.34	1	206.34	4.48	0.036
DISAB by EXP	185.85	2	92.93	2.02	0.137
Error	6441.96	140	46.01		

Table 9 Number of Symbols in Child's Best Sentence (NSYMBEST)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	12.07	2	6.03	0.52	0.596
EXP	0.87	1	0.87	0.07	0.785
DISAB by EXP	49.33	2	24.67	2.12	0.124
Error	1439.32	124	11.61		

1974 Data (cont'd)

Table 10 Number of Symbols in Child's Typical
Sentence (NSYM11YP)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	7.23	2	3.61	0.83	0.438
EXP	0.94	1	0.94	0.22	0.643
DISAB by EXP	14.90	2	7.45	1.71	0.185
Error	530.57	122	4.35		

SUMMARY TABLES OF ANALYSIS OF VARIANCE OF DISAB
BY EXP (DISABILITY BY EXPERIENCE) FOR 1975 DATA

Table 11 Symbol Integration into Child's World (SYMIN)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	11.44	2	5.72	1.96	0.146
EXP	0.17	1	0.17	0.06	0.811
DISAB by EXP	26.94	2	13.47	4.61	0.012
Error	326.95	112	2.92		

Table 12 Child's Attitude Toward Learning New
Symbols (ATTNUS)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	0.45	2	0.23	0.11	0.900
EXP	1.03	1	1.03	0.48	0.489
DISAB by EXP	4.56	2	2.28	1.06	0.349
Error	240.29	112	2.15		

Table 13 Most Frequent Behavior Displayed by Child (BEHFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	5.61	2	2.81	3.11	0.048
EXP	3.53	1	3.53	3.92	0.050
DISAB by EXP	0.14	2	0.07	0.08	0.924
Error	102.82	114	0.90		

1975 Data (cont'd)

Table 14 Settings Where Child Uses Symbol
Communication (SETFR)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	23.30	2	11.65	2.10	0.127
EXP	0.85	1	0.85	0.15	0.696
DISAB by EXP	12.90	2	6.45	1.16	0.316
Error	631.33	114	5.54		

Table 15 Child's Skill with Symbols (SYMSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	3781.87	2	1890.94	4.23	0.017
EXP	221.50	1	221.50	0.50	0.483
DISAB by EXP	1845.69	2	922.84	2.06	0.132
Error	48761.63	109	447.35		

Table 16 Total Number of Skills Achieved by the
Child (NRSKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	17.80	2	8.90	2.07	0.131
EXP	0.85	1	0.85	0.20	0.658
DISAB by EXP	34.01	2	17.01	3.96	0.022
Error	468.57	109	4.30		

1975 Data (cont'd)

Table 17 Highest Skill Area Attained with Regard to the Child's Skill with Symbols (HISKILL)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	15.14	2	7.57	1.94	0.149
EXP	1.16	1	1.16	0.30	0.587
DISAB by EXP	56.89	2	28.45	7.28	0.001
Error	425.68	109	3.91		

Table 18 Sum of Proficiency Scores with Regard to the Child's Skill with Symbols (SPROSKIL)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	523.14	2	261.57	5.06	0.008
EXP	4.24	1	4.24	0.08	0.775
DISAB by EXP	291.38	2	145.69	2.82	0.064
Error	5527.07	107	51.65		

Table 19 Number of Symbols in Child's Best Sentence (NSYMBEST)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	71.83	2	35.91	2.23	0.112
EXP	3.56	1	3.56	0.22	0.639
DISAB by EXP	22.91	2	11.46	0.71	0.493
Error	1672.05	104	16.08		

1975 Data (cont'd)

Table 20 Number of Symbols in Child's Typical
Sentence (NSYMTYP)

Source of Variance	S.S.	d.f.	M.S.	F	p
DISAB	51.20	2	25.60	3.59	0.031
EXP	3.14	1	3.14	0.44	0.509
DISAB by EXP	15.01	2	7.50	1.05	0.353
Error	741.83	104	7.13		

APPENDIX 7

BLISSYMBOL UTTERANCES DEMONSTRATING
SEMANTIC GRAMMATICAL RULES

pages 184 - 198

EXAMPLES OF UTTERANCES

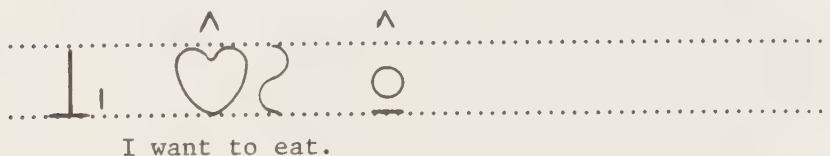
Samples of symbol utterances are presented for examination of sentence length, order and content and should not serve as models for instructional purposes.

Those symbols or words marked with an asterisk, *, are presented as they appeared in the recordings of the student's messages. The asterisk indicates that they are not standard BCF approved forms of the symbols or translations. The non-recommended positioning of the tense marker is indicated thus: (*), (see Syntax section, Handbook, p. 35).

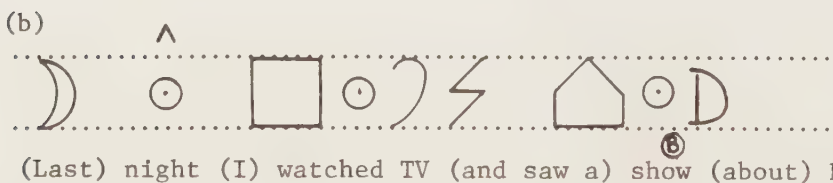
The English translation given is that of the recorder. Brackets have been added to identify those meanings which have been inferred by the recorder from the context of the total communication situation. Those words not appearing in brackets represent the direct symbol-to-word translation.

FROM TABLE 1 (See p. 60):

1. AGENT + ACTION:



2. ACTION + OBJECT:



3. AGENT + ACTION + OBJECT;

(a)



I play record(s).

(b)

I want toy(s) (and) new clothing. [Ⓟ]

4. AGENT + OBJECT;



I (want some) juice.

5. ENTITY + LOCATIVE;

(There was a) dog [Ⓟ] (on the school) bus today.

6. ACTION + LOCATIVE;



(I want) to go (back to) school.

7. AGENT + ACTION + LOCATIVE:**



I went upstairs** to (the) toilet.**

8. AGENT + LOCATIVE;

(a)



I (am in) school.

(b)



My* mother (went to the) hairdresser.*

9. LOCATIVE:



(I am going) home Saturday.

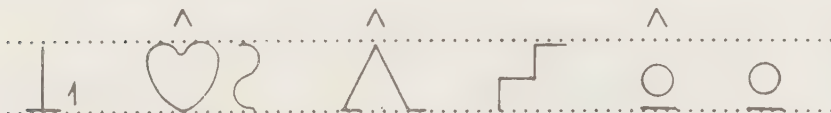
10. AGENT + ACTION + OBJECT + LOCATIVE:**

(a)



I watch(ed) (a) man on TV.**

(b)



I want to walk (do exercises), to go upstairs**, to eat (my)



dinner (and) drink (and go to the) toilet (and go to) bed (and to) sleep (in my) room.**

11. ACTION + OBJECT + LOCATIVE (Imperative);



Please thin my* hair out (of)



my* forehead.

12. AGENT + ACTION + LOCATIVE + ABLATIVE:**



I want to go (to the) restaurant* (in) daddys* car.**

13. AGENT + LOCATIVE + ABLATIVE:**



Mommy (and my) sister (will come on the) bus** (to) school.

14. AGENT + ACTION + LOCATIVE + ABLATIVE** + DATIVE:***

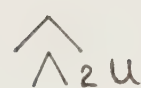


I like to go (to) your* house (in the car)**



to eat bread***, milk (and) soup (and to watch) television (on the) weekend.

15. AGENT + ACTION + ABLATIVE:**


 +
 

 I played with** Ulisses

+
 

 and Linda (last) night.

16. AGENT + ACTION + OBJECT + ABLATIVE:**


 +
 

 I had a fight*with** Ulisses.

17. ENTITY + DATIVE:



 (I received) clothing (for my) birthday.

18. AGENT + ACTION + DATIVE:

(a)
 

 Why are you speaking (to my) father (and) mother?

(b)
 

 Mum and Jamie went to buy* new pants.

19. AGENT + ACTION + OBJECT + DATIVE:**

(*) ^
 Rene (^ 1 U ⊗
 Rene is going to make me** (a) bag (for the back of my) wheelchair.

20. AGENT + OBJECT + DATIVE:**

^
 ^ 1 ^ ↓ (?) ^
 My* mother (is) afraid (of a) burglar* (coming into our house.**

21. AGENT + ACTION + LOCATIVE + DATIVE:**

^
 ^ 1 ^ O (^ d)
 Tomorrow, mom (and) I are going (to) Hamilton Place*(to see)

^ M.

Marcel** Marceau.

22. AGENT + LOCATIVE + DATIVE:**

^
 ^ [] ⊗ ^ ⊗ □ boots black
 Mommy (is going to the) store to buy** (me) black boots.

23. LOCATIVE + ABLATIVE:**

^ [→] ^ ^
 (I went to the) zoo* (on an) outing (with my) father.**

24. AGENT + MODIFIER + DATIVE:**



(My) mother (is) happy (about having more) money.**

25. OBJECT ALONE:



juice

26. MODIFIER ALONE:



(I am) happy.

27. OBJECT + INTRANSITIVE VERB + OBJECT or MODIFIER:



The furniture is dark* black. (B)

28. AGENT + ACTION + CLAUSE:

(*) ^ (*) ^
 I₁) I₂) → I >1 PH.

I heard you were coming to Participation House

^
 O x Σ x 28 / D →

to talk on symbol(s) on the 28th (of) this month but

(*) ^ ^
 I₂ (-! · V → |

you won't be able to come.

29. AGENT + MODIFIER:

^
 [?] I₂ ♥ ↑

(Are) you happy?

30. NEGATIVE STATEMENTS:

(a) non-existence:

x (*) ^
 I₃) △ -!! ⊙ C.

They (Christie Company) made no cookie(s).

(b) rejection:

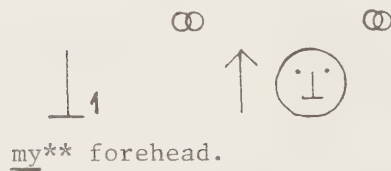
no example

(c) denial:

Now workmen* aren't working.

FROM TABLE 2 (see p. 61):

1. DESCRIPTIVE:

(a) attribution**:I want toy(s) (and) new** clothing. ⑥(b) possession (inferred)**:Please thin my** hair out (of) ,my** forehead.

2. TENSE INDICATOR:

- included**:

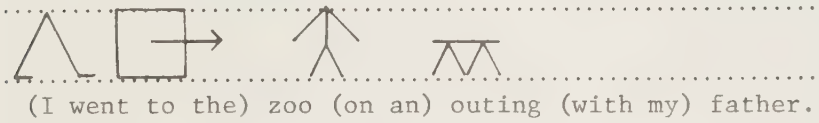
I went** upstairs to (the) toilet.

- inferred:



3. CLASSIFICATION OF STATEMENT:

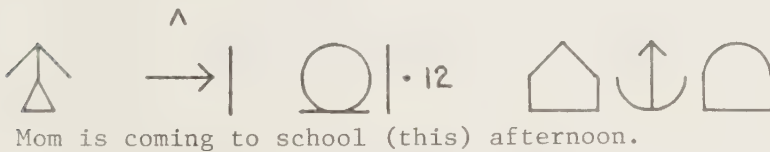
(a) at beginning of sentence:



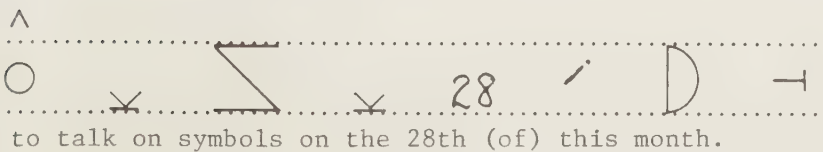
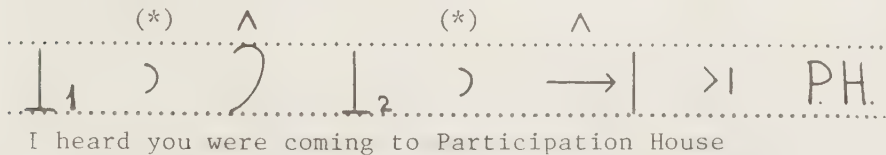
(b) at end of sentence:



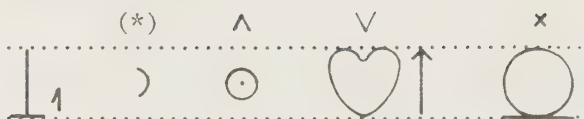
4. TIME REFERENCE:



5. TIME REFERENCE WITH PREPOSITIONAL PHRASE:

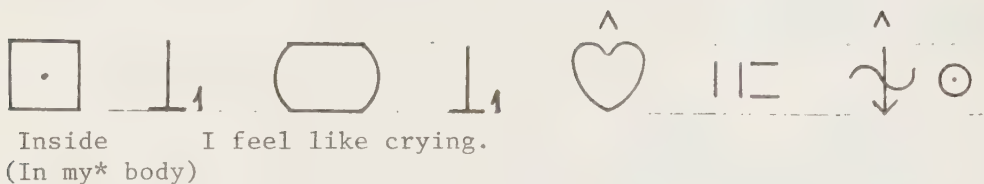


6. PLURAL:

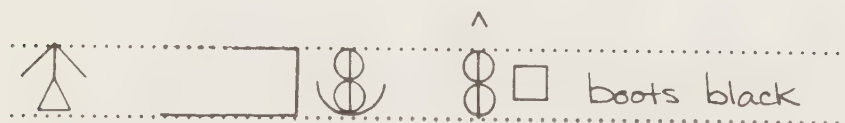


I watched "Happy Days".

7. SYMBOL STRATEGIES:

- Combine:- Like:- Opposite:

8. NON-SYMBOL STRATEGIES:

- Gesture**:

Mommy (is going to the) store to buy black boots.**

- Letter:

cookie(s)

- Word:

Rene is going to make me (a) bag (for the back of my) wheelchair.

- Use of articles:

The new [Ⓢ]cupboard(s) are on (the) wall (both) up (and) down.

- Use of to word; (not necessary)**:

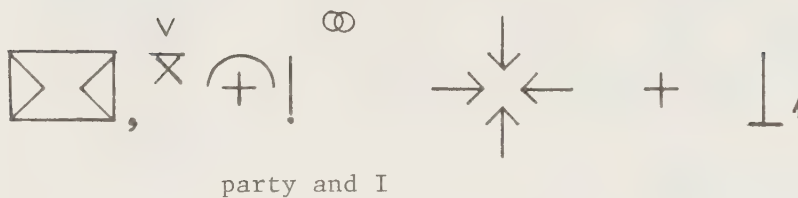
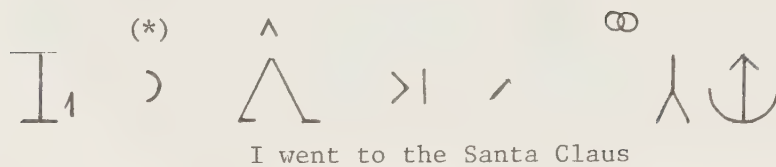
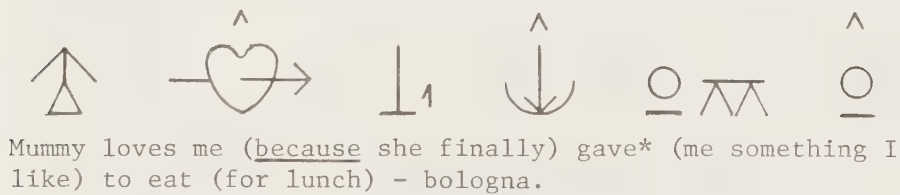
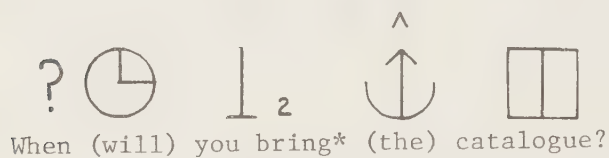
I went to** eat.

- Use of to symbol; (not necessary)**:

Mum and Jamie went to** buy

new [Ⓢ]pants.

9. SENTENCE TYPES:

- Compound (with conjunction):- Compound (without conjunction):- Question:

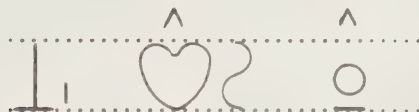
- Imperative:

Please thin my* hair out (of)

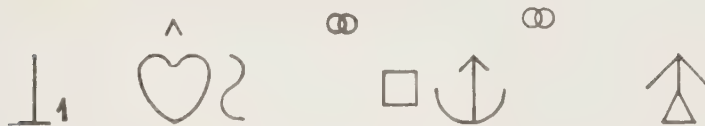


my* forehead.

10. PARTS OF SPEECH

- Secondary verb, included:

I want to eat.

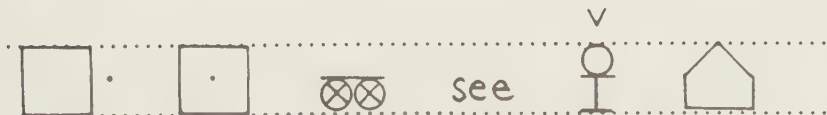
- Secondary verb, inferred**:

I want (to buy)** (a) gift (for my) mother.

- Conjunction, included**:

See compound sentence (above)

- also -

My* sister and** my* brother will go

out in (the) car to see (their) new house.

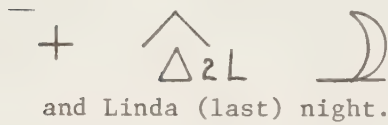
- Conjunction, inferred**:

See compound sentence (above)

- also -



- Preposition, included**:



APPENDIX 8

BLISSYMBOL USERS DISCONTINUED
FROM THE EVALUATION STUDY

page 199

DISCONTINUED STUDENTS

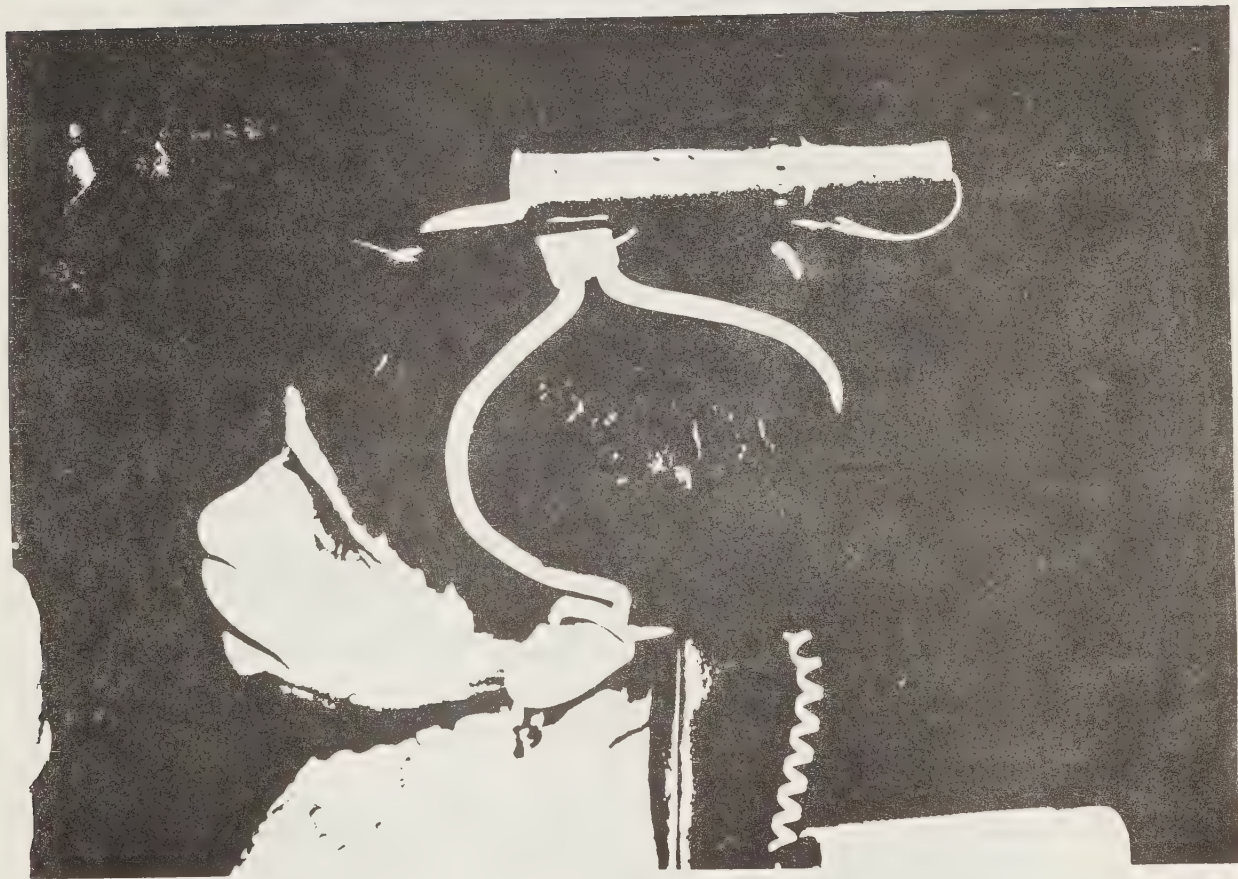
It is expected that in any research study of this nature some of the recordings will be discontinued. Of the 157 students in the original population, 27 were unable to remain in the research study. Formal notification (i.e. a written statement) of withdrawal from the study was received for 24 of the 27 discontinued students. Although reasons for withdrawal were varied, the following categories are the major reasons for discontinuation along with the number of participants involved.

Category	Population No.
a) A change of physical placement, e.g. move to new community, change of school, medical evaluation in other state, etc.	7
b) Lack of funding, appropriate support staff, appropriate children, etc.	7
c) Rejection of symbols either through active refusal, disinterest, or improvement of other functions, e.g. speech.	4
d) While continuing symbol program, participant inappropriate for research record-keeping.	4
e) Deceased*	2

*We are sorry to say that we lost 2 of our students, Todd and Gary, during the study.

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The first part of the report deals with the general situation of the country. It is a very interesting and informative study of the country's development. The second part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development. The third part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development. The fourth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development. The fifth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development. The sixth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development. The seventh part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development. The eighth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development. The ninth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development. The tenth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development.

